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The JOURNAL of GEOGRAPHY

A Monthly Magazine Devoted to the Interests of Teachers of Geography in Elementary, Secondary and Normal Schools

Ray Hughes Whitbeck, Editor
Lawrence Martin, Associate Editor
Of the Department of Geology and Geography,
University of Wisconsin

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The JOURNAL of GEOGRAPHY

Volume XV SEPTEMBER 1916 Number 1

THE ANDES AS A FACTOR IN SOUTH AMERICAN GEOGRAPHY

BY WALTER S. TOWER
University of Chicago

THE Andean Cordillera is the most conspicuous physical feature of South America. It also is one of the greatest of all mountain barriers. Its length is about 4,500 miles (Lat. 11° N. to 55° S.), and for more than half this distance it is continuous at an average elevation exceeded only by the Himalayas. The Himalayan barrier, however, is continuous for only about 1500 miles, whereas the Andes are unbroken for a distance nearly twice as great. Furthermore, the position of the Andes, so close to the Pacific coast and with the very low and flat interior plains on the east, makes the relief of these mountains somewhat greater and sharper than in most of the great highlands of the world.

To cross the highland from the west, for example, anywhere between latitudes 5° and 35° S., it is necessary to make an ascent from sea level to 10,000 to 15,000 feet, the heights of the passes, within a horizontal distance of less than 100 miles in most cases. On the eastern side of the highland, similarly, a horizontal distance of but little more than 100 miles separates mountain peaks of 20,000 feet from flat plains less than 1000 feet above sea-level. With such great extent, high altitudes and marked relief, the Andean Highland must be an important factor in the geography of the continent.

The Andes, however, should not be discussed as a whole with respect to the important influences which they have exerted in South American development, because of the different characteristics and relations, from one place to another, in their great north and south extent. It is convenient to make at least three divisions, according to well-marked characteristics which distinguish each section from the others. These three divisions may be called the Southern Andes, the Middle Andes, and the Northern Andes, each division representing not far from one-third the whole length of the Cordillera. The chief distinction between sections are: (1) width; (2) altitudes; (3) development of separate ranges and plateaus; and (4) continuity, or relations to drainage. There are also from section to section differences in geological relations, climate, vegetation and other natural resources which help to accentuate the contrasts.

THE SOUTHERN ANDES

The Southern Andes, extending from the southern tip of the continent to about latitude 30° S. may be described, in general, as a narrow, complex range, running very nearly due north and south. Along this axis, the width of the mountain zone varies from forty or fifty miles to more than one hundred miles in some places; the width tending to increase toward the north. The summit altitudes increase from six or seven thousand feet near the southern end to the highest peaks of the continent near the northern end; Aconcagua exceeding 23,000 feet, with Tupungato and Mercedario probably reaching 22,000 feet. These, and many others ranging from 14,000 to 18,000 feet, are volcanoes, only a few of which are active. Through most of its length this mountain zone is occupied by two or more ranges, approximately parallel, with no great contrast in elevations from one range to another. For the most part the ranges stand so close together that there are few valleys of much importance, and very little development of intermontane plateaus.

As a whole, the Southern Andes are less of a barrier than either of the other two divisions, partly because the altitudes average lower, partly because the mountain zone is not so wide, and especially because low passes are much more numerous. At the northern end of this section, streams are small and few, none of them cross the Cordillera, and the passes are high, 10,000 to 13,000 feet, the most famous, Uspallata Pass, having an elevation of about 12,790 feet. From about the 38th parallel southward streams are larger and more numerous, and some of them cross the Cordillera, as a result of which there are many more passes, at comparatively low elevations, 3,000 to 6,000 feet. South of the 42nd parallel, however, the inhospitable character of the region west of the Andean crest robs most of these passes of any importance which they otherwise might have.

The results of lower altitudes, narrow mountain zone and numerous breaks in the ranges are found in the extent to which the sections along the eastern flank have been influenced by relations with Chilean settlements on the west. Between the 38th and 42nd parallels, for example, the relations with the trans-Andean districts have been on the whole more important than those with the Argentine centers to the east.

The Southern Andes as a whole do not offer attractive conditions for settlement, for various reasons, among which are: (1) the lack of plateaus between the different ranges and the limited extent of accessible valleys; (2) the extreme ruggedness of most of the mountain zone; and (3) limitations imposed by climate and its effects. The northern part is so arid that between the 30th and 35th parallels there is little or no vegetation even on the lowest slopes. From about latitude 38° southward, forests, containing both coniferous and broad-leaved species, covers both flanks up to heights of 4,000 feet or more. Aside from this forest resource, much of which, especially on the east, is difficult or impossible to exploit now, there are limited areas suitable for farming or grazing in the mountain valleys, and some possibilities of mineral resources. Remoteness from markets and difficulties of transportation have largely prevented the development of what resources the Southern Andes do possess. Mining is, of course, the least handicapped by such conditions, but in spite of evidences of minerals in various places, mining in any large way has been confined to the western flank, north of the forested zone, where copper mining is the chief activity. The 34th parallel marks about the southernmost limit of important mining development in the Cordillera.

As a result of these conditions, the southern Andean region is very sparsely populated, in fact, parts of it have been so little explored that some large areas are marked on the maps as "unexplored forests." It was this lack of detailed information about the region which led some years ago to the serious boundary dispute between Argentina and Chile. The boundary treaty (1881) provided that "the frontier line shall run . . . over the highest summits . . . which divide the waters," etc. Chile interpreted the treaty to mean the drainage divide and Argentina held that it meant the crest line of the Andes. In the sections of the highland well known at the time the treaty was made the main crest and the drainage divide do approximately coincide, but as already noted, they do not coincide in the southern section. Thus both countries laid claim to some large tracts both in the Cordillera and adjacent to the eastern flank south of latitude 40°.

On the Chilean side especially (for ten degrees of latitude) and also in part on the Argentine side (as in Mendoza and Neuquen), important settlements lie close along the Cordillera, and in places small settlements have extended into the more favored valleys or about the glacial lakes. This is most largely the case between the 38th and 43rd parallels, under the influence of somewhat larger valleys, a better climate than either to the north or the south, and the lines of communication across the numerous low passes. Yet the largest "towns" along these mountain routes number only a few hundred persons, and in the whole mountain zone of the Southern Andes the population certainly averages lower than one person per square mile.

THE MIDDLE ANDES

The Middle Andes, which extend from latitude 30° to about latitude 14° S., are sharply differentiated from the Southern Andes in topography and climate. North of the high volcanic peaks which mark the culminating altitudes of the Cordillera, the mountain axis divides, and gives three distinct lines of crests which are only approximately parallel. The major axes, one on the west and the other on the east of the highland, diverge from the southern limit of this district to about latitude 18° S. and then converge towards the north. The maximum distance between them (in the vicinity of the 18th parallel) is approximately 450 miles, giving a highland belt three or four times as wide as the widest part of the Southern Andes. Between these two marginal ranges lies a great plateau which in extent and altitude is exceeded only by the Plateau of Tibet. Across the plateau a third, and minor, range of mountains runs more or less parallel to the eastern range, and divides the Andean tract into an eastern and a western section, consisting of a plateau area and a great bordering mountain barrier, the barrier shutting off the coast slope on the one side and the interior plains on the other. The highest peaks of this section are among the loftiest on the continent, several of them exceeding 20,000 feet, as Illimani, Illampu and Sajama, while many rise nearly to that height. The seaward range averages somewhat higher because it is less broken by low passes than the eastern range, although the highest peaks in the eastern range exceed any that lie on the western side. The plateau has an average elevation of more than 10,000 feet, and much of it is between 12,000 and 14,000 feet above sea level.

The Middle Andes throughout their extent serve as the divide between the Atlantic and the Pacific drainage. The western range lying in the main within 150 miles of the coast, receives very little rainfall, has but few small streams descending its flanks, and is not broken by any river valley. As a result, the important passes lie between 12,000 and 15,000 feet above sea level. The eastern range, on the other hand, and the adjacent plateau serve as the sources of several great tributaries (as the Mamore and the Pilcomayo) of the Amazon and Parana drainage. These streams have deeply dissected the eastern side of the highland, but the great gorges through which they cross the eastern range are so deep and steep-sided as to offer only poor lines of communication between the highland and the neighboring interior plains. Since none of these east-flowing streams head west of the central range, the western part of the plateau is a great mountain-rimmed basin, containing the famous lakes, Titicaca and Aullagas, which are among the highest known. This is one of the few areas of basin drainage in the continent, and is perhaps the least rugged part of the whole Cordilleran area.

Climatic contrasts along the Middle Andes are somewhat more important than in the section to the south. The location close to and within tropical latitudes means more agreeable temperatures at the higher altitudes; this fact and the lower precipitation account for the high snow line and the few glaciers. The western side throughout offers an extreme case of aridity and barrenness, not only on the Andine flank but also on the adjacent coast lands of Chile and Peru. Part of the eastern side is arid, but not so barren, while north of the tropic especially dense forests lie near or overlap the lower slopes. On the plateau aridity prevails, and the typical scanty vegetation of the *puna* gives the region a general aspect of barrenness and desolation.

Ruggedness, low temperatures due to altitude, and aridity combine to limit sharply the crop raising or grazing possibilities of the Middle Andes. Forest resources exist only along the eastern flank, more or less inaccessible for most purposes. Minerals, on the contrary, are present in large amounts, and for centuries have provided the chief field of development in the region; silver and gold in the earlier years; tin, copper and others more recently.

For various reasons the plateau is the most important part of the Middle Andes; it covers more than 200,000 square miles; is completely isolated by great mountain barriers, desert tracts and dense forests; and is without doubt the most conspicuous of all tropical plateaus. In it was developed, in part at least, the high native civilization under Inca influence, which was far more advanced than that reached by lowland tribes at the time of the Spanish conquest. On it now are found some millions of people (close to three millions) living at altitudes which are near the limit of permanent human habitations. Only in Tibet, in a much larger area, are such numbers living at so high elevations, while no other city of equal size (about 70,000) lies at so great an altitude as La Paz (12,200 feet), the capital of Bolivia. Along most of the Middle Andes the highland population is more important than that on the adjacent coast slope or interior plains, the only exception being near the southern end on the eastern side, where some Argentine centers of population are larger than those in the neighboring highland. This concentration of population in the Andean zone is due apparently to (1) the unfavorable character of much of the lower lands; (2) the location of early centers of Inca activity; (3) the Spanish interest in mining and resulting regulations as to movement of population; and (4) general inertia of much of the population which tends to prevent change of abode.

The great height of the passes and width of the highland make the Middle Andes a most effective obstacle to communication and cheap transportation, especially between the Pacific coast and the interior plains, which in few places are more than 500 miles distant. This barrier influence may be illustrated by the fact that along the upper waters of the Mamore places less than 400 miles from the Pacific find their chief exit to the world by the Amazon route to Para, more than 2,500 miles away. As a result of these conditions the highland area, especially toward the north, has but little intercourse with the other parts of the countries in which it lies. Thus instead of serving as an international barrier like the Southern Andes, the Middle Andes divide countries internally, as is most marked in Bolivia.

THE NORTHERN ANDES

The Northern Andes extend from about latitude 14° S. to the Caribbean coast. They are narrower than the Middle Andes, have less expansive plateaus, are somewhat more dissected and are marked by many transverse ranges and spurs. There are also, both in Peru and Colombia, great intermontane valleys parallel to the general trend of the Cordillera, and in Colombia especially these valleys divide the highlands into three sharply defined ranges. Along most of the northern section the highest peaks range between 15,000 and 18,000 feet, but in places volcanic mountains rise to about 20,000 feet.

The most conspicuous group of these loftly volcanoes stands in the Andes of Ecuador, where Sangay, Tunguragua, Chimborazo, Cotapaxi, Antisana, and Cayambe, from 19,000 to 20,000 feet high, occupy a belt about 125 miles long. The Northern Andes, however, are less continuous at high altitudes than other parts of the Cordillera south to latitude 38°, partly because there are some passes lower than 10,000 feet and partly because both eastern and western ranges are deeply notched here and there by the gorges of Amazonian and of Pacific tributaries. Thus entrance to the highland both from the east and the west is somewhat easier than in the Middle Andean section. Nevertheless the Northern Andes have been fully as effective as a barrier to communication between the Pacific coast and the interior plains, because: (1) no stream cut across the whole width of the highland; (2) the ruggedness is extreme, owing to the pressure of deep valleys and transverse ranges between the main mountains; and (3) the vegetation on the eastern side of the highland is dense up to an elevation of several thousand feet. North and south lines of communication within the highland are, on the contrary, far less difficult to travel, as illustrated by the navigability of the Maranon, Magdalena and Cauca; the lines of villages along the valleys of Colombia and Peru; and the so-called highways which parallel the mountains for hundreds of miles.

The Northern Andes are only in part an important climatic barrier. Northward to latitude 4° S. the western side is arid, as shown by a snow line 17,000 to 18,000 feet above sea-level, while the eastern side is very rainy. In the whole section north of the equator, there is not much difference at corresponding altitudes between places on the flanks and those in the highland, unless account is taken of the somewhat greater rainfall on the Pacific slope in the Colombian section. The modifications of climate due to altitude are less important than in the Middle Andes, because the plateau areas lie mainly below 10,000 feet, and the longitudinal valleys are in large part not more than 5,000 feet above sea-level, with their lower stretches showing little difference from the near-by plains.

A minor division perhaps should be made between the Colombian section and the rest of the Northern Andes. Near the boundary between Ecuador and Colombia, cross spurs unite the eastern and western mountain ranges. South of this transverse barrier, an eastern and a western range of about equal prominence are separated by sixty to a hundred miles of plateaus, valleys, and minor transverse ranges. North of this dividing line, there are three diverging mountain ranges, the central one being the most prominent. Between these ranges there is little true plateau, but instead, there are the great valleys of the Magdalena and Cauca, which by their northward courses to the Caribbean make the accessibility of the Colombian section easier than is the case in Ecuador and Peru.

In the Northern Andes there are somewhat greater contrasts than in the Middle or Southern Andes, due to the proximity of low intermontane valleys, high isolated plateaus, and lofty mountains. Heavy forests, typical of hot, rainy plains, stand in sharp contrast with the almost barren surfaces (the *puna* an *paramo* tracts) of most of the plateaus which lie higher than 10,000 feet. Ease of access, relations to the outside, and character of activities developed, vary greatly from place to place. But everywhere along the Northern Andean zone the highland populations are larger than the groups t othe east and west, due largely to lack of rainfall, as on the Peruvian coast, or excess of rain and vegetation, as in most other adjacent areas. In the three republics through which the Northern Andes extend, the total population exceeds 10,000,000, more than half of which lives in the highlands, and depends chiefly on agricultural and pastoral occupations.

CONCLUSIONS

In spite of the fact that the Andes are so high, rugged and difficult of access in most sections, the density of population is much greater than on the interior plains of South America. Yet in proportion to its area and natural resources, the Cordillera is supporting only a small part of the population which it might have. Full development of resources and growth of population must depend largely on improvement and extension of transportation facilities. Good wagon roads are unknown in most sections and would be difficult to build and maintain in many sections; short railroads traverse parts of the highlands, but the total mileage is insignificant. Only one railroad crosses the Cordillera, the Transandine between Mendoza, Argentina, and San Carlos de los Andes, Chile; other lines cross the western range of the Middle and Northern Andes: as from Antofagasta, Arica and Mollendo to the Bolivian plateau; from Lima to Oroyo; and Guayaquil (Durban) to Quito. No railroad crosses the eastern ranges anywhere between the southern tropic and the Caribbean. Many proposals have been made concerning additional trans-Andean lines, but the difficulties presented probably are serious enough to prevent the carrying out of most of the projects. Taking all things into consideration, therefore, it seems likely that the Andean highland will continue largely to dominate the character of development in the western republics of South America, and will remain an effective barrier, cutting off most of the interior lowlands of the continent from the Pacific sphere of development.

LITERARY SELECTIONS AS AN AID IN TEACHING GEOGRAPHY

By James F. Chamberlain
State Normal School, Los Angeles, Cal.

EDUCATION must do more than store the mind with information, important as this is. We now recognize that the educational process must present the conditions which shall make for the development of self-reliance, of reason, of honesty and for the living of happy and useful lives.

Aside from reading, writing and arithmetic which are tools without the use of which modern civilized life is impossible, the school presents nothing which can be made more interesting, more useful or more elevating than the subject of geography. It is the *one* subject in the entire school curriculum which shows the relationships between the daily life of man in all times and all places and the world of nature by which he is so largely influenced.

Today in addition to the *where* we demand the *why*. We are striving to have the pupils understand that the earth is undergoing a process of evolution, and to have them gain some conception of the laws governing this evolution. We wish them to understand how climate, surface, soil, streams, forests and minerals modify the life of man, and how man responds to the influences of nature, taking advantage of favorable conditions and so far as possible, changing unfavorable ones. In other words our fundamental purpose in teaching geography is to enable pupils to form some reasonably adequate conception of the mutual relations between the earth and human life. This involves a study of both the earth and man. When the earth is studied as the home of man, and the responses which man makes to his physical environment are presented, geography becomes highly attractive and exceedingly valuable.

But in our commendable effort to have pupils discover relationships and develop the power of reasoning, let us not forget that the mind should be filled with beautiful and enduring pictures and that the spirit should be quickened. In a broad sense, reading and travel are the two most important channels of education, and these are stimulated by pleasing mental images. Moreover the arousing of pleasurable emotions will make for the retention of the information and relationships which we desire our pupils to acquire.

The tendency in our teaching is to slight the human phase of the subject, or to present it in the form of facts unrelated to the environmental conditions. This, in large measure, robs geography of interest, reality and value. There is much in the form of prose and verse which, if introduced into the geography class, would illuminate geography, give an added interest to literature and history and fill the mind with uplifting thoughts. If it be true that "It is the soul that sees, the outward eyes Present the object, but the mind descries," then we should not fail to appeal to the emotions as well as to the reason, in the teaching of geography.

Only a few of countless valuable literary selections can be given here. In some cases they should be read by the pupils and in others by the teacher. They may be used to introduce topics or they may follow the study of them. Sometimes a very beautiful selection will contain statements which are entirely incorrect geographically. The teacher must weed these out, or if they are read, the inaccuracy must be corrected.

The collection of suitable selections in prose and verse involves much time. If, however, the teacher has a filing or recording system the labor is greatly reduced. Many good things can be found in "Poems of Places" a set of small volumes edited by Longfellow.

Would not a more abiding interest in the geography of the Holy Land be created by the recital of Whittier's "Palestine":

PALESTINE

"Blest land of Judea! thrice hallowed of song,
Where the holiest of memories pilgrim-like throng;
In the shade of the palms, by the shores of thy sea,
On the hills of thy beauty, my heart is with thee.

"Blue sea of the hills! in my spirit I hear
Thy waters Gennesaret, chime on my ear;
Where the Holy and Just with the people sat down,
And the spray on the dust of his sandals was thrown.

"Lo, Bethlehem's hill site before me is seen,
With the mountains around and the valleys between;
There rested the shepherds of Judah, and there
The song of the angels rose sweet on the air.

"And Bethany's palm trees in beauty still throw
Their shadows at noon on the ruins below;
But where are the sisters who hastened to greet
The lowly Redeemer and sit at his feet?

"And thrower on her hills sits Jerusalem yet,
But with dust on her forehead and chains on her feet;

For the crown of her pride to the mocker hath gone,
And the holy Shechinah is dark where it shone."

Is the climate of Palestine at all like that of California? Read the lines which support your answer. Upon what kind of ground is Jerusalem situated? Does the map give the same impression as the poem? What is meant by the "blue sea of the hills?" Are there any other bodies of water in the Holy Land?

Of the many wonderful things in India, the Taj Mahal is one of the most wonderful. It was erected by the emperor Shah Jehan for his wife, but before the completion of the building she died and so the beautiful palace became a tomb. The interior of the Taj is decorated with countless precious stones and in the pure white marble thousands of flowers have been cut in relief. It is no wonder that the Taj Mahal has been called a "poem in stone." The story of the building briefly told and the reading of the following poem would give added reality to the geography of India.

THE TAJ MAHAL

"With minarets of marble rising stately from a sea
Of the dark-leaved mangoe's foliage streaked by the jaman tree,
Up to the empyrean where the crescent glitters bright,
Calm and unchanged, still shining through the fall of Moslem might,
One majesty of whiteness the Taj of Agra stands,
Like no work of human builder, but a care of angel hands.

"Majestic shrine of other days, to thee the power belongs
To resist the flight of ages and to awe the stranger throngs;
Long as the sacred Jumna o'er its bed of sand shall flow
Thy glorious dome to heaven shall raise its massive breast of snow,
For the spirit of the monarch and the builders art combine
To guard from lightning's levin-bolt, and time's decay, the shrine."
(Anonymous)

Locate Agra. On what river is it? By what kind of a country is the city surrounded?

In connection with a discussion of the importance of the position of the British Isles the following is interesting and instructive.

"This fortress built by Nature for herself
Against invasion and the hand of war;
This happy breed of men, this little world,

This precious stone set in the silver sea,
Which serves it in the office of a wall,
Or as a moat defensive to a house,
Against the envy of less happier lands;
This blessed plot; this earth, this realm, this England."
Shakespeare, *Richard II.*

Arndt's "What is the German's Fatherland?" expresses a love of country and a broad patriotism that commends itself to all.

"What is the German's Fatherland?
The Prussian Land? The Swabian Land?
Where Rhine's thick-clustering fruitage gleams?
Where on the Belt the sea mew screams?
Not these the land;
His is a wider fatherland.

"What is the German's Fatherland?
Bavarian, or Westphalian Land?
Where on the Dunes the wild sand blows?
Or where the Danube brawling flows?
Not these the land;
His is a wider fatherland.

"What is the German's Fatherland?
O name at length this mighty land!
As wide as sounds the German tongue,
And German hymns to heaven are sung,
That is the land;
That, German, is thy Fatherland.

"To us this glorious land is given;
O Lord of Hosts, look down from heaven,
And grant us German loyalty,
To love our country faithfully;
To love our land,
Our undivided Fatherland."

Can the pupils locate Prussian, Swabian, Bavarian and Westphalian lands? What is the "thick clustering fruitage" of the Rhine? What German river other than the Rhine is mentioned? Look at the map. What part of the river is in Germany? Why is this part a "brawling" stream?

That the city of Venice is located upon islands and that, for the most part, canals take the place of streets, should not be the chief result of a brief study of the city. The children should know why Venice was so located. They should understand the advantage which its position gave it in early times and the disadvantage attaching to it today. It is important that the pupil really appreciate something of the charm attaching to the "Queen of the Adriatic." Longfellow's "Venice" can very profitably be used either as an introduction to the study or as a means of testing the character of the mental picture which the children have formed.

"White swan of cities, slumbering in thy nest
So wonderfully built among the reeds
Of the lagoon, that fences thee and feeds,
As sayeth thy old historian and thy guest!
White water-lily, cradled and caressed
By ocean streams, and from the silt and weeds
Lifting thy golden filaments and seeds,
Thy sun-illumined spires, thy crown and crest!
White phantom city, whose untrodden streets
Are rivers, and whose pavements are the shifting
Shadows of palaces and strips of sky;
I wait to see thee vanish like the fleets
Seen in mirage, or towers of cloud uplifting
In air their unsubstantial masonry."

There are few more beautiful rivers than the Hudson. The Hudson and the Rhine are frequently compared but the former lacks the historic associations possessed by the Rhine. Whittier, Bryant, Holmes, Curtis and others have written of the Hudson. Holmes says:

"'Twas a vision of childhood that came with its dawn,
E're the curtain that covered life's day-star was drawn;
The nurse told the tale when the shadows were long,
And the mother's soft lullaby breathed it in song.

"There flows a fair stream by the hills of the west,"—
She sang to her boy as he lay on her breast;
"Along its smooth margin thy fathers have played;
Beside its deep waters their ashes are laid."

"I wandered afar from the land of my birth,
I saw the old rivers renowned upon earth,
But fancy still painted that wide flowing stream
With the many-hued pencil of infancy's dream.

"I saw the green banks of the castle-crowned Rhine,
Where the grapes drink the moonlight, and change it to wine,
I stood by the Avon, whose waves as they glide
Still whisper his glory who sleeps at their side.

"But my heart would still yearn for the sound of the waves
That sing as they flow by my forefathers' graves;
If manhood still honors my cheek with a tear,
I care not who sees it,—no blush for it here!

"Farewell to the deep-bosomed stream of the West!
I fling this lone blossom to float on its breast;
Nor let the dear love of its children grow cold,
Till the channel is dry where its waters have rolled."

Of the Hudson Curtis says:

"Its spacious and stately character, its varied and magnificent outline, from the Palisades to the Catskills, are as epical as the loveliness of the Rhine is lyrical. The Hudson implies a continent behind. For vineyards it has forests. For a belt of water a majestic stream. For graceful and grain-goldened heights it has imposing mountains. There is no littleness about the Hudson, but there is in the Rhine ——. The Danube has, in parts, glimpses of such grandeur. The Elbe has sometimes such delicately pencilled effects. But no European river is so lordly in its bearing, none flows in such state to the sea."

Of a certain kind of literature California has an over-supply. Of a more beautiful class she will have more as time goes on. But although California is young some beautiful things have been written by her sons and daughters. A part of Brete Harte's "San Francisco" is useful in the geography class:

"Serene, indifferent of Fate,
Thou sittest at the Western Gate;

"Upon thy heights so lately won
Still slant the banners of the sun;

"Thou seest the white seas strike their tents,
O Warder of two Continents!

"And scornful of the peace that flies
Thy angry winds and sullen skies,

"Thou drawest all things, small or great
To thee, beside the Western Gate."

Why is San Francisco Bay our "Western Gate?" What is our eastern gate? Of what other continent than ours is San Francisco the "Warder?"

Some of John Muir's inimitable descriptions should be presented to every child in the upper grades. Their beauty will create a desire for more and a love for the beautiful in nature. In speaking of the work of glaciers he says:

"Contemplating the works of these flowers of the sky, one may easily fancy them endowed with life: messengers sent down to work in the mountain mines on errands of divine love. Silently flying through the darkened air, swirling, glinting, to their appointed places, they seem to have taken counsel together, saying, 'Come, we are feeble; let us help one another. We are many, and together we will be strong. Marching in close, deep ranks, let us roll away the stones from these mountain sepulchers, and set the landscapes free. Let us uncover these clustering domes. Here let us carve a lake basin; there, a Yosemite Valley; here, a channel for a river with fluted steps and brows for the plunge of songful cataracts. Yonder let us spread broad sheets of soil, that man and beast may feed; and here pile trains of bowlders for pines and giant Sequoias. Here make ground for a meadow; there, for a garden and grove, making it smooth and fine for small daisies and violets and beds of healthy bryanthus, spicing it well with crystals, garnet, feldspar, and zircon.' Thus and so it has often seemed to me sang and planned and labored the hearty snow-flowered crusaders; and nothing that I can write can possibly exaggerate the grandeur and beauty of their work. Like morning mist they have vanished in sunshine, all save a few small companies that still linger on the coolest mountain sides, and, as residual glaciers are still busily at work completing the last of the lake basins, the last beds of soil, and the sculpture of some of the highest peaks."

The Mountains of California.

No phase of geography offers better opportunities for showing the influence of environment upon human affairs and man's response to his environment, than does the study of weather and climate. A technical consideration of these topics cannot, of course, be undertaken below the high school. But even in the elementary school, considerable attention should be given to the importance of weather and climate in the various areas studied.

In all of the inhabited parts of the earth man's relation to atmospheric conditions is shown in the nature of his agriculture, stock raising, transportation of goods and people, character of houses, dress, food, and in the ordinary social and business affairs of every-day life.

It is highly important that children should know something of the work of the United States Weather Bureau as opposed to mere guess work and superstition. There are, of course, certain conditions which precede a storm and these have given rise to our "signs" as applied to weather. Let the pupils see how many of the forty signs of rain as given by Dr. Edward Jenner, they can verify.

1. The hollow winds begin to blow;
2. The clouds look black, the glass is low,
3. The soot falls down, the spaniels sleep,
4. And spiders from their cobwebs peep.
5. Last night the sun went pale to bed,
6. The moon in halos hid her head;
7. The boding shepherd heaves a sigh,
8. For see, a rainbow spans the sky!
9. The walls are damp, the ditches smell,
10. Closed is the pink-eyed pimpernel.
11. Hark how the chairs and tables crack!
12. Old Betty's nerves are on the rack;
13. Loud quacks the duck, the peacocks cry,
14. The distant hills are seeming nigh.
15. How restless are the snorting swine!
16. The busy flies disturb the kine,
17. Low o'er the grass the swallow wings,
18. The cricket, too, how sharp he sings!
19. Puss on the hearth, with velvet paws,
20. Sits wiping o'er her whiskered jaws:
21. Through the clear stream the fishes rise,
22. And nimbly catch the incautious flies.
23. The glow-worms, numerous and light,
24. Illuminated the dewy dell last night;
25. At dusk the squallid toad was seen,
26. Hopping and crawling o'er the green;
27. The whirling dust the wind obeys,
28. And in the rapid eddy plays;
29. The frog has changed his yellow vest,
30. And in a russet coat is dressed.
31. Though June, the air is cold and still,
32. The blackbird's mellow voice is shrill;
33. My dog, so altered in his taste,
34. Quits mutton bones on grass to feast;
35. And see yon rooks, how odd their flight!
36. They imitate the gliding kite,
37. And seem precipitate to fall,
38. As if they felt the piercing ball.
39. "Twill surely rain; I see with sorrow,
40. Our jaunt must be put off tomorrow."

NAMES OF CITIES

By Frederick Homburg
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As mankind developed both numerically and culturally, old cities grew and new ones were founded, so that the growth of towns in number and in size may be taken as a gauge of civilization. The very word "civilization" comes from the Latin "civis," a citizen; a citizen of course of the state, but with Greeks and Romans, city and state were practically identical. When a land was overpopulated the people spread by migration or colonization or conquest over outside territory and thus new towns were founded, old ones increased, and such as had been destroyed were rebuilt. New towns must be named, but the names of old ones were usually accepted by conquerors as well as by colonists, though often very much changed. Due to this conservatism, the last traces of languages of extinct peoples are found in place names. Thus we find Keltic and Latin names in France, Keltic and Slavic ones in Germany, Keltic and Danish names in England.

History is traceable in the names of places; note the periods in Alexander's conquest marked by the founding of Alexandrias; while the spread of the Greek colonies, the establishment of Carthaginian trading posts, and the success of the Roman legions, which made of the Mediterranean Sea a Latin lake, all these are recorded in the names of towns.

Whatever significance a proper name may have at first, the meaning may be lost, but the name persists. Every town was at one time new; yet in referring to a new settlement as the new town, this may become its name, and it is called so long after the prefix ceases to have any meaning. Thus we find a new city or a new town (most of them quite old) in many lands; Newtown and Newton, both names practically the same, occur in England and its colonies and in the United States. There are several towns named Neustadt (new city) in both Germany and Austria; and the country or district must be specified in addresses, if you wish letters to reach their destination. In Russia we find a number of towns called Novgorod or Novgrad (new city); and Naples in Italy means the same, for this name corrupted in English comes from Neapolis. Of course the word "New" is prefixed where a place is named after an older town. It is only natural to name a settlement a city, a town or a village according to size; hence we find these terms usually united with a distinguishing adjunct. One of the few relics of the Keltic languages in Central Europe is the word or (as it is usually part of a word) the syllable—*dun*. This was latinized by the Romans to *dunum*, as for example Lugdunum, the old name for Lyon on the Rhone. Another form of the word is—*din;* thus Londinium the ancient London. The word still persists in Issondun (the old Isoldunum), Verdun (the old Verodunum), Dunbar, Dundee, and many others. The Germanic form is *tun* and denotes that which encloses, i. e., hedge, fence or wall; and this by metonymy, using a part for the whole, has become in Dutch *tuin*, the name for garden, and in English *town* or *ton* or *ten* or *den*, the name for a larger settlement. Hampden, Hampton, Hamilton, Newton, Washington, were originally place-names; now of course, towns are named in honor of such celebrated individuals or families.

A different North-Germanic word *hagen* and its corrupt forms mean nearly the same, i. e., a hedge; for example, Stavenhagen, Friedrickshagen, Copenhagen and The Hague. Not merely the hedge, the word *garden* itself has been used as a place name long before the garden city was ever planned. The German for garden is *garten*, which occurs in Morgarten, Damgarten, Liepgarten, etc.

If hedge and garden are used to designate a town, why not house? Just as a house affords protection to members of one or more families, so many families are housed in a town. Names such as Muehlhausen, Nordhausen, Schaffhausen are numerous in Germany; *Haus* is the same as house, and is pronounced the same. An old form of this term related to but probably not derived from the Latin is wick or wich in English, as Greenwich, Norwich, Woolwich, Ipswich, Berwick, Warwick. The Dutch spell this *wijk* and this word by itself means a city district: thus we have Rijswijk, Harderwijk, Winterswijk. The German form is *weig* or *wig* as in Bramschweig, (which the English call Brunswick), Schleswig. In the Norse languages *wick* is changed to *vik;* thus the capital of Iceland is Reykjavik, and in Sweden we have Vestervik, Waldemarsvik.

The word villa, (not Mexican but Latin), as the wealthy Romans called their country houses, is the root of innumerable city names. When such a country seat was surrounded by the huts of dependents, the group was called *villagium*, hence our name village; a dweller therein was a *villageois* or *villanus*, from which comes villain, a term in Old English law for a serf. But the real villain is the city dweller, for *ville* is the French term for city; the city hall of Paris (as those of other French towns), is called Hotel de Ville. Naturally many towns in France are called by names with *ville* as suffix: Abbeville, Joinville, Granville, Thionville, etc. In naming towns in the United States, besides taking over French names such as Belleville, Louisville, we unfortunately have the maps of our states dotted with hybrid towns as Knoxville, Evansville, Jacksonville, Jeffersonville, Danville, Janesville, McConnellsville, Lopezville, etc. Their number is legion, but none is worse than the early name for Cincinnati. The plural of the Latin Cincinnatus is bad enough, but Losantiville is worse, a pedantic welding together of words from three languages to denote the city opposite the mouth of the Licking River; Licking furnishes the initial L; *os* is the Latin for mouth; *anti* from the Latin means opposed to or opposite to, and *ville* is the French for town.

In Norse lands the suffix,—*by*, connected with the verb "to build" and hence about equivalent to house, stands for town; thus we have in Scandinavia: Wisby, Oksby, Wimmerby; and in England: Whitby, Selby, Derby, Rugby, etc. A house is a home, hence we are not disappointed in expecting this word as part of many place-names. In England we have many instances of the old form ham as in Durham, Buckingham, Chatham, Birmingham; while in German it retains the spelling *heim* (which means home) as in Manheim, Hildesheim, Oppenheim, etc. Hamburg is probably the same as Heimburg, and Trondhjem in Norway would be Drontheim in German. *Dorf* is the German for village; and as every town must have been a village in its early stage, we have names such as Burgdorf, Altdorf, Hochdorf, etc. One of the large cities on the Rhine is called Dusseldorf, which means the village at the mouth of the Dussel, a small affluent of the Rhine. Dorf is *dorp* in Dutch and *thorpe* in English as Mabelthorpe.

Some small places may be called city with no apparent reason but the hope of future development. The German name for city is *stadt* which we find in Halberstadt, Darmstadt, etc. If inconsiderable towns have names with this word as a suffix, it must be remembered that its original meaning is "place," just as in the German preposition *anstatt* which means "instead of," i. e., "in place of." The English form is *sted* or *stead;* Hempstead, for example; while the Norse is *stad* or *sted* as Kristianstad, Fredrikstad, Karlstad, Orsted, Thisted.

In Greece the city was the center of life, the *pole* about which everything turned, and the Greek name for city is *polis.* When Constantine rebuilt the ancient Byzantium, it was called Constantinople, i. e., the city of Constantine. Neapolis is the new city, Metropolis the mother city or chief city, Petropolis the stone city, Necropolis the city of the dead. The meanings of Minneapolis, Indianapolis, Annapolis are readily seen. An old nickname for Cincinnati was Porkopolis, not because of the meaning in this word, but because there was a time when it was the great pork center.

The Latin for a community was *civitas;* there is in Italy a Civita Vecchia (old city), and in Spain a Ciudad Real. The name of a fortress of a town really means small city for "citadel" is a diminutive.

Town names frequently remind us of the fact that a fortress was the nucleus or the early limit of a place, which afforded shelter in case of danger. The name of a fortified Roman camp *castrum* (plural *castra*) is perpetuated in Lancaster, Winchester, Dorchester, Manchester, Gloucester, Worcester, etc. *Castillum,* the diminutive of castrum, is found in Newcastle and all the other "castles." The German word for castle is *burg.* One of Luther's best known hymns begins thus:

"Eine feste Burg ist unser Gott";

which is rendered: "Our Lord's a castle strong indeed." Burg is spelled *bourg* in French, *borg* in Swedish, and *burgh, borough, boro* and *burg* in English. Examples are so numerous that a selection of the best is not easy. In Germany there are Brandenburg, Wursburg, Strassburg, Freiburg and many more; in France, Cherbourg, Bourges, Bourg St. Maurice; in Sweden, Goteborg, Trelleborg, Helsingborg; in Denmark, Aalborg, Svendborg, Viborg; in England, Marlborough, Scarborough, Salisbury, Canterbury, etc. In the Slavic language *gorod* or *grad* or *gard* means city; but another meaning now obsolete, of this word is a fortified place or stockade, i. e., equivalent to *burg.* Stargard is the old city or Altenburg or Oldenburg; Novgorod is the new city or Newburg; Belgrad is the white city or Weissenburg, and Petrograd is the same as Petersburg.

Towns have been named from their situation on a river, or at its mouth, at a bridge, or a ford, or a dam, in a valley, on or by a hill. Few towns in the United States have the names of rivers; but has it ever occurred to you how many names of states in this Union are identical with the names of rivers? Take the rivers Connecticut, Delaware, Ohio, Kentucky, Tennessee, Alabama, Mississippi, Wisconsin, Illinois, Dakota (or James), Iowa, Kansas (or Kaw), Missouri, Arkansas, Colorado, Columbia (formerly called by the Indian name Oregon); and for each of these there is a state of the same name. Chicago, Sault Ste Marie, Savannah, Detroit, and Niagara are situated on rivers of the same name. Numerous examples of towns with river names are found in the Old World. Darmstadt is the city on the Darm; Dusseldorf, the village at the mouth of the Dussel. Dunaburg, the fortress on the Duna. In Holland, Amsterdam gets its name from the dam at the mouth of the Amstel, Rotterdam from the dam at the mouth of the Rotte. In Siberia four notable instances are: Tobolsk on the Tobol; Tomsk on the Tom; Irkutsk on the Irkut; Yeniseisk on the Yenisei. If the stream is small, we have Brookdale, Millbrook, etc., and as brook is *Bach* in German, there are place-names such as Marbach, Rothenbach, Erlenbach, Offenbach, etc. Oberammergau, where decennially the Passion Play is given, is on a small stream, the Ammer. A very strange case of a city with a river name is that of the capital of Brazil. The Portuguese explorer who first entered the bay, January 1, 1515, believed he had reached the mouth of a great river, which, because of the date of the discovery he called the January River, thus Rio de Janeiro is named for a river which never had a real existence. Moscow, the heart of Great Russia and the ancient capital of the empire, is situated at the head of navigation of the Moskwa which flows into the Oka, the chief western tributary of the Volga. In Russian speech, river and town have the same name. Its citadel, the celebrated Kreml, controls the passage across the river so that Moscow derived its early importance from the fact that it was a bridge town. A bridge is of great importance, therefore towns in a number of instances have been named for them. Innsbruck is the town at the bridge across the Inn; Zweibrucken, Deux Ponts (new Latin, *Bipontum)* is a town in the Palatinate between two bridges. In France we have Pont a Mousson, Pontarlier, Pont St. Vincent; in England, Cambridge on the Cam, Boroughbridge, Woodbridge, Tunbridge, Uxbridge. Like bridges, fords had early significance, and were sure to be places of settlement; thus Hereford, Stratford, Bedford, Oxford, in England; and in Germany, Erfurt and Frankfurt. A ford for oxen is found in widely different places and in three different languages: Oxford is the name of the old English university town; Ochsenfurt the name of a town on the Main in Germany, and Bosporus, the name of the channel between Europe and Asia; the three words have the same meaning.

The junction of a river with another or with the sea is often marked by a town whose name expresses this fact: thus in England there is Yarmouth at the mouth of the Yare; Tynemouth at the mouth of the Tyne; Tweedmouth at the mouth of the Tweed, Dartmouth at the mouth of the Dart, etc.; in Germany, Gustemunde, Swinemunde, Peenemunde, Travemunde, Angermunde, Uckermunde. Ostia, the seaport of ancient Rome, was so called because situated at the mouth of the Tiber.

Among the harbor towns in England we have Newhaven, Whitehaven, Southport, Portsmouth, etc.; and in Germany: Ludwigshafen, Friedrichshafen, Wilhelmshafen, Cuxhafen; in

Holland: Zaandpoort and Nieuwpoort, the latter the same as our Newport. *Hafen* and haven are equivalents. Two towns are called haven outright: Havana in Cuba and Havre on the north coast of France; but the whole name of the port of Paris is Le Havre de Grace.

Towns are more frequently situated in valleys than on hills, for though the latter positions may be better for strategic reasons, the former are more accessible, and usually are commercial routes; but in either case the situation often furnishes the name. It may be in English *vale* and *dale*, in German *Thal*, in Dutch *daal*, in Norse *dal*. The ideal country for valley towns is mountainous Switzerland, where are found Turbenthal, Kranchthal, Klenthal, Isenthal, Langenthal, etc., but even in Holland we have Roosendaal and Veenendaal; and in Scandinavia Arendal, Mandal, Dalen, etc. The reader can supply names with such suffixes as vale, dale and hill. The German name for mountain is *Berg* and this is found in Neuenberg (usually spelled in English Nuremberg), Heidelberg, Freiberg, and a number of others; in Denmark we have Frederiksberg, Esbjerg; in Norway, Bergen and Kongsberg. Just as the Dutch in South Africa use Kopje (i. e., Little Head, like our Little Round Top or Bald Knob, etc.), they say in Sweden: Jonkoping, Falkoping, Linkoping, Nykoping, Norrkoping.

Rosedale, Rosenthal, and Roosendaal all mean the valley of roses; Rooseveldt or rosefield must have been a place-name before it became a family name. Besides these fragrant appellatives we have very appetizing names of persons derived from names of towns; you may have heard of the Wieners, the Frankfurters, the Hamburgers, the Wurzburgers, the Schweitzers, and possibly of the Limburgers.

The naming of towns in the United States as in all recently settled lands, has been very irregular; most of the names where not fanciful are second-hand; hence the illustrations above were drawn largely from Central and Northern Europe. Why second-hand? Because settlers are apt to call their new home by the same name as the one they left, or they delight in names of large and important cities. Our maps are graced with New London, New Paris, New Berlin, New Vienna, New Rome, New Madrid, New Lisbon, etc. Sometimes names of European countries are used as New Britain, New Cambria, New Scotland, New Albion, New Sweden, New Germany, New Holland, or older towns in the United States as New Boston, New Buffalo, New Trenton, New Baltimore; or names from the Holy Land, as New Galilee, New Jerusalem, New Palestine, etc.

Many towns were named after great men: Washington, Jefferson, Jackson, Madison, Monroe, Lincoln, etc. The names of great cities have been much in favor and therefore as might be expected, the name of the city of cities has been frequently used. There is a Rome in Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Mississippi, Missouri, New York, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, West Virginia, and Wisconsin; all taken together would be but a fraction of the Eternal City in the days of its glory. "See America first" is the slogan, and why not when everything is so conveniently situated. In Ohio without leaving the state you can visit London, Oxford, and Manchester, Paris, Versailles, and Marseilles, Athens and Sparta, Rome and Venice, Moscow and Warsaw, Jerusalem and Tokio; and this does not exhaust the possibilities. Ohio is not alone in this, other states are equally favored; for example, in Pennsylvania we have Athens and Rome, Bethlehem and Nazareth, Geneva and Luzerne, Nineveh and Damascus, Odessa and Pekin, etc. The truth is, we have been tremendous borrowers.

There are some names peculiarly American; as first of these must be mentioned Indian words. The map of Wisconsin shows the following: Cayuga, Kenosha, Manitowoc, Muscoda, Nashotah, Neosho, Oconomowoc, Oneida, Seneca, Waukesha, Wausau, Wauwatosa and many more. A method of coining names of border towns, which may be peculiar to this country, is that of compounding the names of the state concerned. In California Calzona is near the Arizona line, Calexico is on the Mexican border; Kanorado, Kan., is on the Colorado border; Texarkana, Ark., is on the Texas line. A case of three in one is found in Kenova, W. Va., which looks like an Italian proper name such as Canova. A glance at the map will show that its situation (between three states) is the key to its name; Kyova, Okyva or Vakyo might do as well, but the name is Ken-O-Va.

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THE LITTLE END OF HAWAII

By Vaughan MacCaughey
College of Hawaii, Honolulu

THE Hawaiian Islands have risen rapidly in world importance. First, as the supreme mid-Pacific naval base of the United States. Second, as a vital link in all that knits together the Oriental and Occidental civilizations bordering the greatest Ocean. Since the discovery of Hawaii in 1772 by the famous Captain Cook, the successive events of world history have destined this isolated archipelago to an increasingly prominent position in the onward march of civilization in the Pacific. The voluminous literature, both technical and popular, which makes Hawaii its central theme, deals almost exclusively with the eastern, inhabited end of the group. The islands that comprise this part are large and mountainous. They constitute the seat of the industrial and political life of the Territory. They support luxuriant tropical forests. Hawaii, the easternmost island, is larger than all the others taken together.

The western extension of the chain is apparently insignificant. It is the little end. Its sparse, dotted line of islets, reefs, and shoals, stretches eighteen hundred miles Asia-ward from the main group. The combined land area of these microscopic isles is only six square miles. Their interest to natural science, however, is in no way proportionate to their size. Moreover, their utilitarian value is vastly greater than any superficial glance at the map would indicate. Midway Island, a coral ring six miles in diameter, and averaging five feet high by twenty feet wide, encloses a sand island utilized as a relay station for the great trans-Pacific cable. Laysan was for many years an important source of guano fertilizer, plumes, and eggs. In the mining days San Francisco was a market for huge quantities of Laysan sea-birds' eggs. The warm banks and shoals of the series teem with marine life and constitute important fishing grounds. Japanese power-sampans bring weekly to Honolulu thousands of pounds of choice fish and turtle caught in the western waters.

The names of these dots,—and on the maps they seem to be more name than land,—are suggestive of sea-yarns and the tragedies of the deep. In 1805 Captain Lisiansky in the Russian schooner *Neva* stranded on the reefs of the island that now bears his name. Pearl and Hermes Reef caused the wreck of two whaling ships on the same night in 1822, within ten miles of each other. In 1872 Captain Dowsett, in the whaling ship *Kamehameha* was wrecked on Dowsett's Reef. The French Frigates Shoal was discovered by the noted navigator La Perouse, in 1786, and named by him in honor of his two ships. Necker Island was also discovered by him, and named for a great French statesman. The entire series, named in order from east to west, is: Ninoa, Necker, French Frigates Shoal, Gardner, Dowsett's Reef, Maro Reef, Laysan, Lisianski, Pearl and Hermes Reef, Midway, Ocean.

These lonely surf-rimmed isles are of profound geologic significance. They are the last visible remnants of a gigantic, subsiding mountain range. The highest summits were volcanic, like those to the east. The tiny western isles are surf-battered fragments of slowly sinking craters. The islands have been classified as to structure, and degree of subsidence. Nihoa, Necker, French Frigates, and Gardner are eroded volcanic blocks, from 170 to 900 feet in height, steep walled, rimmed by heavy surf, and inaccessible except in the calmest seas. Their arid cliffs resound with the hoarse cries of myriad sea birds.

Laysan and Lisianski are elevated (45-55 feet) coral islands with fringing reef. Pearl and Hermes, Midway, and Ocean, are typical coral atolls, like "garlands on a summer sea." Numerous sand islands are enclosed in their shallow lagoons. Maro and Dowsett's reefs have visible surf, but no exposed coral. There are several shoals (Frost, Brooks, and Gambia), from twelve to fourteen fathoms below the surface of the ocean.

Slowly, imperceptibly, through the long ages these westward islands have been sinking,—inexorably drawn down into their vast eternal grave. The high islands to the east have slowly heaped themselves above the sea. Their fiery craters unceasingly piled lava flood, rock sheet upon rock sheet. The proud snowy summit of Mauna Kea now rises fourteen thousand feet above the glittering Pacific. Hawaii, the island that bears Mauna Kea, is still alive and growing. Scientists now peering into the boiling lava cauldron of Kilauea, predict a great lava flow in the immediate future.* A strange, abyssal contrast,—these barren, sun-scorched, tide-swept atolls, white fragments of gigantic sunken skeletons,—and the reverberating lava lake, with incandescent fire fountains, crowning the colossal dome of frigid Mauna Loa!

The plant and animal life on these remote specks of coral is of rare interest to the naturalist. A lone species of native palm occurs only in an arid gulch of Nihoa. Laysan is overgrown with low bushes, brush, weeds, and grass. The Hawaiian seal is plentiful on many of the isles. In the "fifties" numerous sealing expeditions were made; one ship returned to Honolulu with 1500 skins and 240 barrels of oil. The green sea-turtle uses the coral beaches for its nesting grounds, and is common. All the isles abound with marine bird life; to quote Professor W. A. Bryan "Laysan is perhaps the largest sea-bird colony in the tropics, and its teeming hordes of bird inhabitants may justly claim for it a place as one of the great natural wonders of the world. . . . I have estimated from personal observation and data gathered for the purpose that more than ten million birds formerly visited Laysan Island each year. . . . Naturally the struggle for existence, often for mere nest room, is intense. The air, the vegetation, the earth—all literally swarm with bird life. Almost every inch of land down to the water's edge is occupied." These isles now constitute a federal bird reservation.

As the vast reaches of the Pacific continue to bulk larger and larger in world affairs, and as facilities for inter-island travel are multiplied, these remote infinitesimal specks of lava and coral, with their wealth of suggestion for scientific research, will increasingly command more attention than hitherto has been granted them.

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*It has since occurred,—May, 1916.

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CORK

"As light as cork," is a common saying. As elastic as cork, as impermeable as cork, or as poor a conductor of heat and sound as cork, would be equally apt expressions, for all these qualities are combined to a high degree in this one substance. All attempts to find a substitute possessing this combination of qualities have been fruitless.

Uses.—A low specific density and its impermeability by liquids makes cork especially well adapted for floats and life saving apparatus. Cork buoys mark channels for boats; flat cork buoys are suspended from the stern of vessels to be used in case some one falls overboard; cork mattresses on shipboard have been found valuable in case of shipwreck.

To protect the feet from the wet and cold, a thin layer of cork in the soles of the shoes is advantageous, and if a limb has been amputated, there is no more desirable substitute than a cork limb. In Spain, houses are sometimes lined with cork to keep out the moisture, the heat or the cold. Steam pipes and hot water reservoirs are jacketed with cork to prevent the escape of heat. Cork hats are worn in tropical countries to prevent sunstroke.

The lightness and elasticity of cork make the parings of cork unsurpassed packing material for fragile articles. Elasticity and impermeability make cork most desirable for bottle stoppers. Malaga grapes are packed in cork "sawdust" and shipped around the world in perfect condition. Since cork is a poor conductor of sound it is put into floors of hospitals and apartment houses, or it may be used as a carpet. Linoleum is made by spreading a paste of oxidized cork and linseed oil upon canvass. Distilled cork parings and waste yield an illuminating gas which rivals coal gas. Spanish black, so valuable in painting, is derived from carbonized cork parings. There is scarcely an industry where cork is not a desirable or necessary factor.

Where produced.—Cork is the bark of the cork oak, which grows in all the Mediterranean countries. Numerous attempts have been made to produce cork in other countries, but all have failed. Cork growing has been tried twice in the United States, in Mississippi and in California; the trees grew rapidly, but the cork was found to be inferior and almost valueless. The largest producers of cork are Portugal, Spain, Tunis, and Algeria. The European cork area covers nearly all of Portugal and the Spanish provinces of Andalusia, Estremadura and parts of Catalonia; irrigation is necessary. In Portugal there are over 900,000 acres and in Spain about 625,000 acres of cork oak groves. The tree has been found to flourish best at an altitude of 1600 to 3000 feet, with a mean average temperature of 55° Fahrenheit. The northern limit is at 45°. It usually grows in company with firs and evergreen oaks, although there are forests in Tunis entirely of cork oak.

How collected.—The Spanish law requires that no cork oak shall be stripped of its bark until it measures 16 inches in circumference, a size which it attains when it is about 22 years old. The process of stripping takes place in July or August; with a hatchet, two incisions are made around the trunk, one at the foot of the tree and the other just below the main branches. These incisions are connected by several longitudinal cuts. The bark may then be removed immediately, but if it is left on the tree a while, it will loosen and can then be removed more easily.

Preparation of bark for market.—After stripping, the bark is soaked in hot water and then placed over a fire which blackens the outer surface. This makes it smooth and the cracks and holes are filled with dirt and soot. The pieces are then loaded with weights to make them flat and are then stacked and dried and later packed for exportation. After eight or ten years, the stripping may be repeated. A better quality of cork is obtained from the second stripping.

Manufactures.—Cork manufactures play an important part in Spain, especially in Andalusia. In the United States, there were 62 factories in 1909. The imported raw material amounted to $3,435,000 and the value of the manufactured article was $5,940,000.

ALBERTINE METZNER.

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NEWS NOTES

RESIGNATION OF PROFESSOR R. E. DODGE

PROFESSOR R. E. Dodge, for twenty years connected with the Department of Geography of the Teachers College, New York, has resigned from active teaching and will devote himself to lines of study, writing, and editorial work in the field of geography. Every friend of geography in the United States would regret Professor Dodge's withdrawal from teaching if it meant his withdrawal from active work in geography. Happily this is not the case; it is entirely possible that his services will be as valuable and his influence upon the teaching of geography quite as great as if he had continued in the teaching profession. Through his series of Elementary Geographies, his excellent book (in collaboration with Miss Kirchwey) on the Teaching of Geography, his editorial management of the Journal of Geography for many years, and his wide influence as a teacher and lecturer, Professor Dodge has rendered splendid service to the cause of geography in the United States. The JOURNAL wishes him a score of years more of fruitful and joyous endeavor.

NORTH CAROLINA ASSOCIATION OF GEOGRAPHY TEACHERS

At the instance of the State Council of Geography Teachers, formed and at work several months ago, the University of North Carolina held during its summer term three conferences on the teaching of geography. These conferences were led by Professor Collier Cobb of the National Council of Geography Teachers.

The attendance at the first meeting was more than 300. The North Carolina Association of Geography Teachers was organized at the beginning of the third conference with the following officers: Prof. Collier Cobb, president; Supt. I. C. Griffin of Shelby, first vice-president; Miss Hester Struthers of Columbus county, second vice-president; Mr. John E. Smith, secretary and treasurer.

The North Carolina State Council, as at present organized, consists of Prof. Collier Cobb, University of North Carolina, Chairman; H. E. Austin, East Carolina Training School, Greenville; John Jay Blair, Superintendent City Schools, Wilmington; L. C. Brogden, State Department of Education, Raleigh; E. W. Gudger, State Normal College, Greensboro; E. B. Kimsey, City High School, Asheville; S. L. Sheep, Superintendent of Schools, Marion; and Miss Kate C. Shipp, Fassifern School, Hendersonville.

CHICAGO MEETING OF GEOGRAPHY TEACHERS

During the Summer Session of the University of Chicago, a meeting in the interests of the National and the Illinois Councils of Geography Teachers was held in Rosenwald Hall, the fine new home of the Departments of Geography and Geology of the University of Chicago. Miss Mabel Stark, chairman of the Illinois Council, arranged for the meeting and presided. Professor R. D. Salisbury, Professor R. H. Whitbeck and Miss Stark spoke on the needs of geography and the purposes of the Council. Teachers from about twenty different states were present and a large number enrolled in the National Council and the Illinois Council.

UNIVERSITY AND NORMAL SCHOOL NOTES

Mr. Charles Colby, recently of the Peabody College for Teachers, Nashville, Tenn., has resigned to accept an instructorship in Geography at the University of Chicago.

Mr. Herbert Bassett, who was on leave of absence from the Macomb, Ill., Normal School last year doing graduate work for his master's degree in Geography at the University of Wisconsin, will again take up his work at Macomb. Mr. E. L. Jay, formerly an assistant in the Department of Geography at Wisconsin, has been added to the geography staff of the Macomb Normal School.

Mr. Wellington Jones of the Department of Geography, University of Chicago, is travelling in eastern Asia in preparation for the giving of courses in the Geography of Asia. Prof. W. S. Tower of the same department is conducting a class on an excursion down the St. Lawrence Valley and into the Maritime Provinces of Canada.

Mr. George Simpson (Univ. of Wis. '16) has been appointed head of the Department of Geography of the new Normal School at Eau Claire, Wis.

Professor Lawrence Martin of the University of Wisconsin, assisted by Mr. F. T. Thwaites, had a class of 22 men doing field work in Geology and Geography in the Devil's Lake region (Wis.) during the month of August.

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JAPANESE NOTES

PROSPERITY IN JAPAN

The economic and commercial prosperity brought to Japan by the war in Europe continues unabated. Trade in Japan was at a low ebb when the war broke out, and the last five months of 1914 made a very depressing commercial and industrial record. But orders for munitions began to come in and these were followed by inquiries for other merchandise. Japanese tonnage became much in demand, especially after the Pacific Mail steamers were withdrawn. While orders from allied and friendly powers were being executed, Japan found other markets opening for her trade, so that her manufacturers were unable to cope with the demand. Hence it came about that last year the value of exports reached the record total of 708 million yen,* the last highest being in 1913 when the total was 632 millions. Imports for the year were valued at 532 millions, as compared with 595 millions in 1914, 729 millions in 1913, and 618 millions in 1912. The excess of 175 millions of exports over imports is a record; only four times within the last twenty years have exports exceeded imports. It is fully expected that these figures of 1915 will be surpassed during the current year, and recent statistics of the foreign trade of Yokohama are cited to sustain this view.—[*Jour. Am. Asiatic Assn.*]

JAPAN AND THE PHILIPPINES

With the discussion of the Philippine independence bill in the legislature at Washington much attention has been paid to the possible attitude of the Japanese towards the islands after the withdrawal of American authority therefrom. Some critics have openly declared that Japan is waiting for the first convenient opportunity to grab the Philippines.

While Japan is certainly desirous of extending her interests in the southeastern Pacific, there are certain points upon which Americans as well as Filipinos must be thoroughly informed if they are not to make serious mistakes in dealing with the Japanese.

It is not necessary that Japan should, in order to extend her influence and interest in the south, absorb the lands now under the American, Dutch or French flags. Confining our discussion to the Philippines, it must be emphasized that Japan does not covet the territory. She would, of course, take it if she could get it for a song. It is absurd to tell Americans that the Japanese would not take the Philippines even for a gift. She would be glad to accept it, if America, with the unreserved consent of the Filipinos, were to hand it over to the Japanese without regret or reluctance. But the Japanese know the Philippine situation too well to fancy even for a moment that the islands can be had for the asking. They know that an attempt to acquire the territory would cause them endless trouble and countless expenditure, for the Filipinos who have been opposing the American rule established over them would even more strenuously oppose Japanese rule. Certainly the Japanese are not foolish enough to think that such a game is worth the candle.

The idea of converting the territory into an integral part of the Japanese Empire, therefore, seems highly impractical and out of the question. But if Japan ever were to acquire the Philippines, the acquisition would be made only under one of two conditions. First, she would not decline to become the mistress of the country if the Filipinos would willingly place themselves under the reign of the Mikado. Business sense forbids Japan to fight for the absorption of the islands at any considerable cost of blood and money. Secondly, Japan might be compelled to annex the country, if its internal conditions after the withdrawal of American authority were such as to invite the aggression of ambitious European powers.

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*The yen equals about 50 cents.

The second point is the more vital and must be driven home to the reader. After her bitter experience in China and Korea where she had to confront on the field of battle two European military powers one after the other, Japan would not permit any third power to encroach upon the territorial rights of the Philippines after the benevolent government of the United States has become a thing of the past. Even American suzerainty, with all its professed altruism and its unmistakably well-meaning policy, was, we must confess, not entirely welcome to the Japanese who saw an imperialistic tendency in the westward expansion of American territory. Japan did not raise a voice against the American occupation of the Philippines only because the overwhelming majority of the Mikado's subjects had been convinced that America was her best friend and harbored no sinister designs either upon the Philippines or upon her. Their knowledge that the establishment of American rule in the Far East was incompatible with the cardinal principles of the Monroe Doctrine did not prevent them from according hearty approval of her advent in the Philippines. Had the America of 1899 been as unfriendly towards Japan as the America of today, a different story might have been written, for under such circumstances Japan would not have permitted American domination of the Philippines to pass unchallenged.

What Japan really wants in the Philippines is not territorial rights, but economic privileges such as have been enjoyed by her equally with other nations.

After all has been said and done, we must not forget that the peoples of the Far East stand upon common ground. In the years to come they must by mutual co-operation establish and enforce something of a Monroe Doctrine for their own world. To consume themselves in petty suspicion and disgraceful quarrel is to toll their own knell. This sentiment of ours no nation can better understand and appreciate than does the United States, whose policy in the Americas has been to keep the designing powers of Europe at arm's length.—[K. K. Kawakmi, in *The Japanese-American News.*]

JAPAN'S POLICY TOWARD CHINA

It is at the same time incumbent on the part of Japan to make clear to the American people her Chinese policy. Of late much has been talked about Japan's foul designs on China. Let us consider what would be her fundamental policy toward China as it is dictated by her best interests. It should be and is no other than to cement the bond of amity and friendship between the two nations and to safeguard thereby their common interests. The well-known policy of maintaining China's integrity and independence and the "open door" remains today, of course, the same as it was during the days of John Hay and Jutaro Komura. Japan's Chinese policy, therefore, does not in the least run counter to that of America. True, this policy does not spring from pure altruism on the part of Japan, but from her enlightened self-interest. For it should be apparent even to outsiders that European encroachment upon China would prove extremely prejudicial to Japan's interests, bringing European politics to her very threshold and even endangering her national existence, while the closing of China's door would spell disaster to Japanese commerce and enterprise, which have no better prospect of future development elsewhere than in China. It is, therefore, easy to see that to win China's friendship and to stand together as fast friends in the unfolding of their common destiny would surely have been the corner-stone of Japan's policy toward China. Unfortunately the course each followed ran in an opposite direction. Against the progressive policy of Japan there stood long the Great Wall of self-conceit, bigotry, and prejudice of the mandarins. They remained obdurate to the influence of Western civilization until they saw their capital looted and sacked twice within half a century and their empire shaken to its very foundation.

Had China followed at the time she first met the West the same course and policy as Japan, that is to say, to win her place among nations by her own effort instead of depending for her security upon her size and traditions, or upon the grace of other Powers, then the Far Eastern history of the last few decades would have been a totally different one. "The ultimate aim of our China policy," says Count Okuma, "has been no other than to awaken her from this morbid torpor in order to insure her future prosperity and avoid conflict with European nations." Over and over Japan's friendly warning to China has been given; time and again it has been left unheeded. Nay, even the grave disasters that repeatedly overtook China have not succeeded in awakening her from lethargy. The sad and humiliating spectacles that meet one at every turn in China at the Legation Quarter of Peking where foreign troops are quartered, making the independence of China a sham, at the foreign settlements of Tientsin, Shanghai, Hankow, wherein China's sovereignty is overridden, and are established "republics within the Republic"—*imperium in imperio*—these also have failed to make China bestir herself.

Under the circumstances the utmost Japan could do was to adopt every legitimate means to safeguard her interests and to prevent and forestall European aggression upon her neighbor.

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PRACTICAL EXERCISES ON TOPOGRAPHIC MAPS

By W. M. Davis
Cambridge, Mass.

The Educational Value of Topographic Maps

THE topographic maps now published by the United States Geological Survey are already widely used in schools and colleges as the basis of practical exercises in physical geography; but in some cases that have come to my attention, it has seemed as if the exercises based on the maps were not well planned, and in no case did they nearly exhaust the valuable lessons that such maps may teach. The construction of transverse profiles by platting the heights, taken from map contours, on cross section paper, is a time-consuming exercise, perhaps helpful once or twice but likely to be carried too far. The study of land and water forms on these or on any similar maps is certainly useful, but it is often too unsystematic to be of disciplinary value, because it does not begin with carefully selected simple forms, clearly isolated, and well defined, and advance gradually to forms of greater complication. The study of land forms on maps of actual regions should, indeed, always be preceded by the study of artificially simplified maps of type examples. The use of maps of actual land areas in their natural complication as a means of illustrating idealized types to beginners in physical geography is a good deal like the use of pages from the account books of a large mercantile establishment as a means of illustrating the simple processes of addition, subtraction, multiplication, and division to beginners in arithmetic.

It was with a view of providing a graded introductory series of ideal types that I included a number of simple, invented maps of imagined forms in my *Practical Exercises in Physical Geography* several years ago. However, for those who have not time or inclination for so systematic an approach to the subject, much can still be done by beginning with maps of actual regions. In the most elementary exercises suggested below, it is assumed that the student is advancing through the elementary stage in which acquaintance is made by some means or other with different kinds of land forms, and that he supplements his text book with exercises intended to give facility in reading maps on which selected kinds of forms are illustrated, in order that he may later be proficient in describing actual landscapes. The more advanced exercises may be profitaby added to college courses.

The prevailing lack of proficiency in geographical description must impress every critical reader of articles upon exploration, such as appear in the leading geographical journals of the world. The authors of such articles, after traversing certain little known regions, naturally wish to give some account of them to others; and as one of the many readers thus addressed I have often made a faithful effort to visualize the landscapes described, but as a rule with small success. Part of the failure has doubtless been on my side, but the larger part is on the side of the authors, who for some reason or other omit various details that are essential to intelligibility. Perhaps the authors were less interested in the forms of the regions traversed than in the people who occupied them; perhaps they were interested enough in the land forms, but had never had adequate training in geographical descriptions; perhaps they were interested and trained in landscape description, but did not have assiduity enough to make written record while the facts were still before them: the result is the same, their descriptions do not suffice to portray the regions described to their readers. I believe that all three deficiencies may be lessened by preparatory exercises in the description of landscapes. The best preparatory exercises must be conducted out doors on carefully selected districts; but it is a very difficult matter to conduct such exercises as part of school work. It is with the object of suggesting similar exercises, based on topographic maps and adapted to the limitations of indoor teaching, that these pages are written.

NARRATIVE DESCRIPTION

Let it be assumed that a chapter on "plains and plateaus" has been studied: the teacher may then place a map representing a characteristic part of the Atlantic coastal plain or the Appalachian plateau before each member of the class, and assign the following exercises: Select a route for a walk or a drive of a day or two across the quadrangle, and write a two, three, or four page account of what you would see. A teacher who has not yet made trial of such an exercise, will, I believe, be surprised at its useful and disciplinary possibilities. A simple description should suffice for young beginners, who need tell little more than directions, distances, heights, and local names; much more may be demanded from advanced students in a college course, who should give details concerning hill and valley forms, describe general views from hill tops, and introduce imagined personal experiences appropriate to the district traversed. The composition thus produced evidently deserves consideration for its English as well as for its geography. The essence of its narrative form is that it presents the successive elements of the district traversed in the order in which they are encountered along the route that is followed. It thus serves as an introduction to the narrative record which a traveler might make in his journal, day after day, in his passage across an unknown country.

Narrative reports may vary not only in grade, as above intimated, but also in scale and in principle. Practice in writing on different scales, which corresponds to mapping on different scales, may be secured by requiring that the most important points of a three or four page report shall be reduced first to one page, and then to ten lines. This is of high practical value. It teaches a young writer how to tell the gist of his experiences, while excluding the less important details. Condensed narration must be well written, in order not to be dry; and nothing contributes so much toward the training needed in the preparation of a well written condensed report as practical exercises that result in producing it at the end of successive steps of approach.

Narrative reports may be varied in principle by specifying that some students shall avoid all explanatory terms and phrases such as account for valleys by erosion, for river directions by relation to initial land-slopes, for the location of villages by waterfalls or harbors, and so on; while other students shall use explanatory terms and phrases as far as possible. In other words, the first group is limited to the statement of visible matters of fact in empirical terms and phrases, from which all inferences as to past conditions, unseen processes, and supposed influences are ruled out; while the other group is urged to make use of pertinent theories in giving explanatory description to land forms and of reasonable inferences in accounting for the location of roads and villages, but it is at the same time cautioned to express any doubts that may be felt regarding inferences and explanations by some appropriate phrases, such as "it seems to be" or "it looks as if", and so on. In no other way can the contrasts between the empirical and the rational treatment of geographical problems be so well emphasized; in no other way can students be given so good ground for making choice between the two methods of treatment, one of which is so clearly an old fashioned, obsolescent method, that was unconsciously developed in an era when geographical facts were regarded as merely existing, while the other is as clearly a consciously planned, advancing method, by no means perfected as yet, but already characteristic of an era in which the evolutionary philosophy has shown that geographical facts, like all other facts, are full of meaning, and that the discovery and announcement of their origin and development and meaning goes a long way in emphasizing their mere occurrence. Is it not plain, then, that with variations of grade, of scale, and of principle, narrative reports may give abundant and valuable exercise in geographical study?

INDUCTIVE REPORTS

Let it now be assumed that, after a few exercises in narrative reports on plains and plateaus have been performed, the class advances to the study of a chapter on mountains, concerning which a series of inductive reports are to be prepared. Here a number of maps from the Appalachian or other mountains should be brought forward; the various features, tographic as well as physiographic, represented on a quadrangle, are then to be grouped together according to their kinds, and their kinds are to be arranged or classified in some systematic order. Here again the reports may range from elementary to advanced, from condensed to detailed, from empirical to explanatory; but now, instead of travelling along a single route and presenting the facts there found in the accidental order of their encounter, it may be assumed that all the facts of an entire quadrangle, having become known by observation on many routes, are to be described in groups following some order that the young geographer may select or devise. Among the kinds or groups of things are ridges, valleys, streams, roads, villages; and these groups are not only to be separated from each other, they are also to be subdivided. Ridges may be subdivided according to height, length, direction or other features; streams, according to their direction, or to the relation of their direction to that of adjacent ridges; villages, according to their location on low ground or high, on streams or divides, and so on. It should be regarded as "fair play" to ask the teacher for needed information, not contained on the maps when it is needed in forming or in subdividing groups. For advanced classes, the topographic map may be supplemented by the other maps and the text of a geological folio.

The essence of this kind of a report is that it first brings things of a kind together, independent of the order in which they are discovered; it then arranges the various kinds of things according to some consistent plan; it next describes or defines each of the kinds according to some systematic method of geographical treatment; and it finally subdivides each kind into its varieties. While a narrative report corresponds to a traveller's story, such as geographical journals usually publish, an inductive report corresponds to a text book. A narrative report describes each thing of whatever kind separately and for itself; an inductive report describes many things of a kind all together by generalizing them; that is, by selecting the essential features in which all the things of a kind agree, and omitting the individual features in which few or no things of a kind agree. Thus the idea of "type" is developed. True, this idea has been employed in the previous narrative reports, for everything then mentioned must have been named in terms of some previously acquired type, but at that time the idea of type was unconsciously accepted and employed, now it is consciously analyzed and developed. Definitions of groups or types framed by different students may be profitably compared; and when modified and improved by discussions, the definitions thus based upon the study of geographical features on maps may be advantageously compared with corresponding definitions in different text books; much wholesome discussion may be thus provoked; pupils may be even led to learn that a text-book is not necessarily final or infallible.

Furthermore, the principal of "classification" will be developed as the different members of unlike groups are subdivided. When classification is first attempted, it may be so little understood that valleys, for example, may be classed by placing all the long valleys in one category, all the wide valleys in a second, and all the deep valleys in a third, without perceiving that the features by which these categories are characterized are not mutually exclusive. The teacher may have to aid some pupils by explaining that the true idea of classification involves the separation of groups of things into subgroups according to the variation in the value of some feature that all the things possess. All valleys have lengths; hence valleys may be classified as long, medium, and short; all valleys, of whatever length, have breadth; hence all valleys, first grouped according to their length, may then be subdivided according to their breadth; and the three subdivisions thus formed may be again divided as to depth, making 27 subgroups or varieties in all. A very little of this sort of thing will be enough for beginners; for advanced students, there can hardly be too much of it if they wish to advance still farther.

However naturally a number of ridges or of valleys, or of roads, or of villages, may fall into groups and sub-groups and thus, as it were, assemble themselves around their ideal type, they will still show some individual variations and such variations are ordinarily indicated by the use of adjectives to qualify the type noun. Care should be taken to select adjectives that best indicate the observed departures from type. In view of the variations of a group of things discovered on a single quadrangle, it is to be expected that a greater range of variations will be discovered when the field of observation is enlarged; and this will suggest that some adjectives should be held in reserve for future need. Here we encounter a process that may be called systematization, which I have treated at some length in an essay on the "Principles of Geographical Description" (Annals Assoc. Amer. Geogr., V, 1915, 61-105; see p. 77-85), but which cannot be considered here, farther than to indicate briefly that through this process the student may greatly enlarge his equipment with types and varieties of types—his "mental outfit" as it may be called—in preparation for future observational work. Suppose, for instance, that several cuestas, represented on different topographic maps, are reported for comparison; one may be low and narrow but well defined; another may be broader and higher, yet so much dissected as to be ill defined; one may be so flat-topped as to resemble a plateau; another so steep on both sides as almost to merit the name of ridge. As soon as these differences are apprehended, let the class be asked to imagine other values of the differences than those represented by the maps, to draw diagrams for their illustrations, and to select adjectives for their description.

Again, as further exercise in systematization, let all the elements of form in all these cuestas be searched out and defined, not as an abstract exercise, but as the most practical means yet invented for the quick observational detection and the accurate and intelligible description of any and every kind of cuesta, wherever and whenever met. Can anyone doubt that from a class whose mental outfit is thus enlarged, there will be a good chance for the emergence of a successful geographer!

REGIONAL DESCRIPTION

A long step in advance of inductive treatment is made when regional description is attempted. Let it be supposed that the chapter on sea-coasts has now been reached in the text book, and that maps of a mountainous coast are selected for description. The effort here is not to set forth the features along a single route in narrative form, following the accidental linear order of encounter on a journey, nor to group the features inductively according to their kind, and arrange the various kinds of features according to some adopted system; but to present them all in their natural grouping in such a manner as shall give the best possible understanding of the region as a whole. The method that will best accomplish this object is not yet agreed upon among geographers; there are presumably many "best" methods, each one to be preferred in view of special considerations. But it should be clear that, whatever method is best, it can be best reached by gradual approach through preliminary exercises on narrative and inductive reports; for regional description is the most difficult branch of geography, the goal of geographical endeavor.

Regional description, like the other forms of presentation already considered, may vary in grade, scale, and principle. Variations in grade will naturally accompany progress in geographical study through several years of increasing proficiency; variations of scale will be determined by the specifications of the teacher during school and college years, and by the exigencies of opportunity afterwards; variations in principle are not likely to be practised after a choice of principle has been made, for success in whatever principle is then adopted will demand devoted attention for it. Choice of principle should therefore be delayed long enough for it to be made intelligently, but not so long that no chance for later practice in applying it is allowed.

In the practical accomplishment of a regional description, its grade, scale, and principle having been decided upon, the chief difficulty lies in determining the order in which different features shall be mentioned; for although the object is areal, the means are linear; however many things occur together simultaneously in a given region, they must be mentioned one after the other. The systematic order of classification, approprite for inductive reports is not appropriate here; the first things to be mentioned should not be the easiest to understand or the simplest to describe, but the dominant features of the region, after which the subordinate elements should follow according to their relative importance. Evidently the inorganic features of land forms should precede all the organic features that occur upon them; and in a full description, such as is based on outdoor observation instead of on map study, climatic factors should be introduced between the land forms and their inhabitants; and the inhabitants should include plants and animals as well as man, and the correlations of all these factors should be clearly brought out; but exercises based on maps are limited to land forms and items of human culture, with the addition of plant assemblages such as forests and swamps when they are represented. Regional descriptions based on maps are therefore by no means complete, but they are valuable as introductions to more complete descriptions.

A few words may be allowed to emphasize the importance of exercises on different scales. Regional description is difficult under any conditions; but it is most difficult under the condition of limited space, when choice has to be made between what may be included and what must be omitted. Exercises on this topic should always proceed from detailed through medium to condensed statements. It is not to be expected that students should agree with one another as to the contents of condensed description, for agreement on so difficult a matter has not yet been reached even by professional geographers; but in any case, whether a condensed regional description is written by a tyro or by an expert, it will be better done if its limited contents have been carefully selected from an abundance of knowledge, than if they are hastily thrown together from a scanty store of information. Hence a full statement of facts should be written out first; and condensation should be progressive through two or three degrees. It is much easier to prepare a good condensed account in this gradual manner than in a single stride. Try it and see.

The evident difficulty that stands in the way of students gaining proficiency in geographical description through narrative, inductive, and regional exercises of different grades and scales and principles is the lack of time. There are, more is the pity, few schools or colleges in which geography is studied so seriously as to warrant the assignment of hours and years enough for this purpose; but I am convinced that if time can be found for some such exercises as are here outlined, the results gained will be repaying. Yet, as in all exercises, specified by one person and carried out by another, they will be almost worse than useless if they are in charge of a teacher little informed and less interested in geographical science. The enforced performance of these exercises under unfavorable conditions would be as dull and spiritless as their willing performance under favorable conditions may be lively and profitable.

There is an indirect advantage that will follow from map exercises, to which allusion has not yet been made: they will familiarize the youth of the nation with the value of good maps and thus make their value greater still. It was but a generation ago when, apart from the charts of the U. S. Coast Survey and from a few maps of specially surveyed areas, our people had practically no opportunity of knowing what a good map is. They saw the simplified maps of school atlases, the land-office outlines of western states, the rough state and county maps that serve the needs of commercial travellers, express companies and the like, and the caricatures that too often take the place of maps in railway folders, but they had no means of seeing topographic maps on which the slopes of mountain sides, the breadth of valley bottoms, the fall of streams and many other facts are shown. Topographic maps for 40% of the area of the United States have been published in the last 35 years; many of the earlier sheets are deficient in accuracy, but all the later ones are excellent examples of topographic art; even the existence of these maps is unknown to vast numbers of our people. Surveyors, foresters, highway engineers, irrigation companies, and many other professional men use the maps abundantly and know their value; but few of them know that, at the present rate of progress in mapping, about a century will be needed to complete the topographic map of the United States. Progress is slower now than it was 30 years ago because better work is exacted. About half a million dollars has been spent on this work every year for ten years past, but if at that rate a hundred years will be needed to survey the whole country, it is plain that larger appropriations must be made in order to expedite the completion of the map.

Teachers who recognize the value of good topographic maps in their own work, and their technical value in many other directions may well take a hand in urging more rapid progress; and for this purpose the meetings of state branches of the National Council of Geography Teachers offer good opportunity for united action. But even with increased appropriations, scores of years must pass before the maps are completed, and in the meantime, the young pupils of today will grow up. Let us see to it that they grow up with a well founded understanding of what good maps are, and of their many uses in practical affairs. Then they will, in their turn, see to it that work upon the maps is continued and expedited.

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SWINE FEEDING FROM OAK FORESTS IN SPAIN

In western Spain certain lands covered with oaks are utilized by sending pigs into them to feed on the acorns. Toward the middle of autumn when the pastures begin to be poor and the acorns on the evergreen oaks which are earlier than the cork oaks, begin to ripen, the feeding begins. The process follows a certain order and is aided by knocking the acorns down with poles. The forest is usually divided into four parts and the acorns knocked from the trees in the low-lying quarter first; then the second after about two weeks, and so on. The pigs indicate their hunger for the acorns and the workmen do not begin until that time to knock them off.—[From the *Monthly Bulletin of Agricultural Intelligence and Plant Diseases,* August, 1913.]

DEVELOPMENT OF AGRICULTURE IN THE PINE-BARRENS OF THE SOUTHEASTERN UNITED STATES

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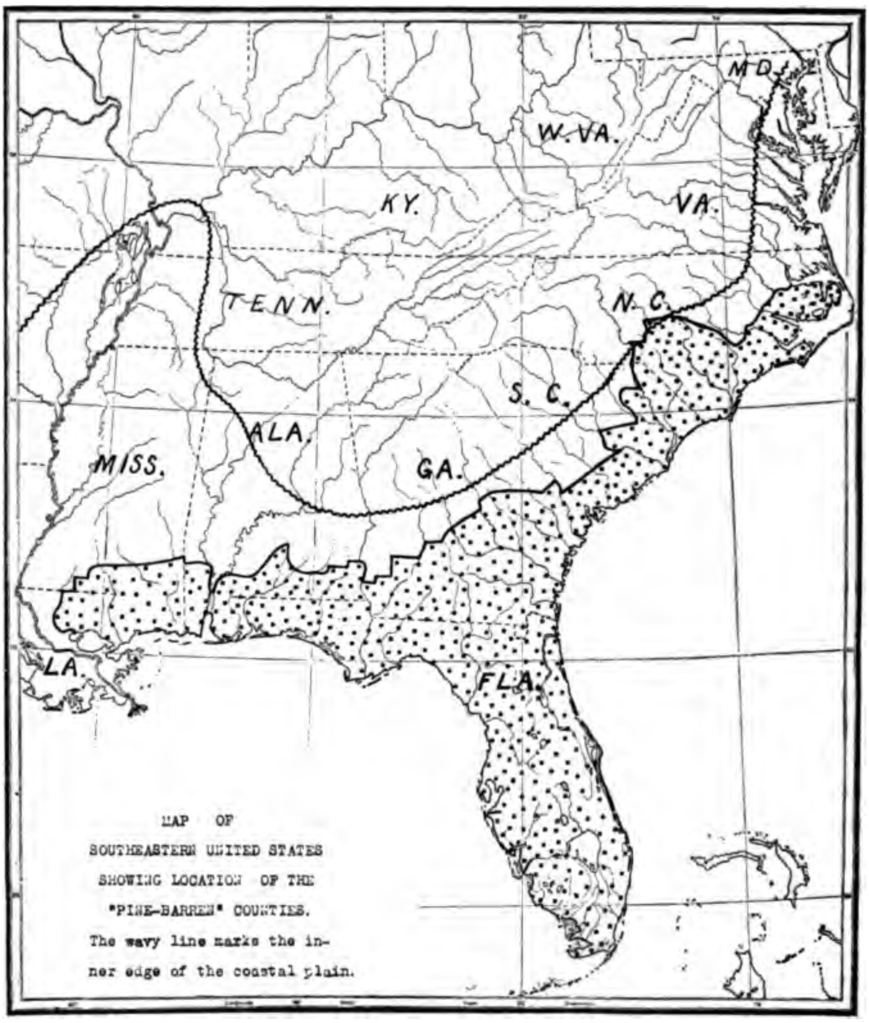
SOMETHING over half the area of the coastal plain of the southeastern United States (see accompanying map) is known as the pine-barren region, and characterized by sandy soil and open forests of long-leaf pine, interspersed with swamps



of all sizes and varieties. Half a century ago this region was regarded as almost worthless for agricultural purposes. The population averaged less than ten inhabitants to the square mile, and the chief industries were lumbering, turpentining, and stock-raising. The lumber and turpentine came from the long-leaf pine (which is one of the world's most abundant and useful trees), and the wire-grass and other herbaceous undergrowth of the park-like forests, making up in quantity what it lacked in quality, furnished free pasturage for cattle. Cultivation of the soil was chiefly confined to the vicinity of rivers, to spots where a clay stratum approached the surface, and to the small areas that could be fertilized with the available stable manure; the cleared land made up considerably less than 10% of the total area. The swamps, which cover something like 10% of the area under consideration, also furnished some timber and pasturage, but little attempt was made to utilize them for agriculture.

Today economic conditions in the pine-barren country are quite different. The farmers there are boasting of the fertility of their land (and paying a higher price for it than for some of the naturally richer land farther inland), and the population and acreage of tilled land have trebled since 1860 and doubled since 1880; some individual counties having doubled their population in a single decade. Railroad mileage has increased even more rapidly, and new towns have sprung up almost like mushrooms. Swamps are being drained and cultivated, and many new reclamation projects are being agitated.

Between the middle of 1900 and the middle of 1915 there were three new counties created in North Carolina, three in South Carolina, fifteen in Georgia, five in Florida, one in Alabama, and four in Mississippi; and all but three or four out of the 31 are in the long-leaf pine country of the coastal plain. Numerous other evidences of prosperity and rapid development, which need not be enumerated here, can be plainly seen in that part of the country. At the same time somewhat similar developments have taken place in other parts of the world characterized by sandy soils and pine forests, such as the Cumberland Plateau of Alabama and Tennessee, southern Delaware, southwestern France, Holland, and northern Germany.

Meanwhile large areas of rich land in the South and elsewhere have been almost at a standstill, except where manufacturing developments have attracted population. There are many counties in the richer parts of all the southeastern states (also in

Illinois, Iowa, Missouri, etc.) that lost population between 1900 and 1910 or in some other recent decade. (See the Statistical Atlases of the U. S. Census). Some of the emigrants have doubtless gone farther west, but large numbers have simply moved to the sandy lands in their own states. This migration has naturally involved young white men more than any other class of people, with the result that the proportion of women, old men, and negroes has increased on the rich lands. In Alabama every county in the "black belt," the most fertile section of the state, has at the present time more women than men and many more negroes than whites.

The developments above outlined are illustrated statistically in the following table, computed from government census reports. The area of the states south of the Ohio River and east of the Mississippi is divided into two parts, one with relatively rich soil and the other with much sand and swamp. The boundary between them on the map is not the exact natural boundary (which is more or less indefinite anyway), but follows county boundaries, in order to simplify the statistical work. Although there are fertile spots below the line selected, and isolated areas of pine-barrens farther inland, none of these covers the whole of any one county, so that it is hardly worth while to make allowance for them in the statistics. Of course if these exceptions were taken into consideration the contrast between the two areas would be still greater.

The pine-barren counties, covering about 132,000 square miles, are indicated by shading on the map, and the rich lands considered here are the states of Virginia, Kentucky, Tennessee, and the unshaded portions of the Carolinas, Georgia, Alabama and Mississippi, about 284,000 square miles in all. In the table the rich lands and the pine-barrens are compared with each other and with the whole United States. The first three columns of figures give the number of inhabitants per square mile in 1860, 1880, and 1910; the next the percentage of increase between 1880 and 1910; the next three the percentage of the total area classed as "improved land in farms" in 1880 and 1910, and the percentage of increase, and the last two the number of acres of improved land per inhabitant in 1880 and 1910. (Statistics of the average value of farm land and total property values would show a similar trend, with perhaps even greater contrasts; but they would be less accurate, on account of the variable psychological factor involved in the conception of value).

	Density of Population				Percentage of Improved Land			Improved Land per Inhab.	
	1860	1880	1910	Increase 1880-1910	1880	1910	Increase	1880	1910
ich lands...	25.1	34.5	50.5	46%	29.5	39.7	34%	5.5	5.0
ne-barrens.	7.8	11.6	24.5	111%	6.4	12.8	99%	3.5	3.3
Whole U. S...	10.6	16.9	30.9	83%	15.0	25.1	68%	5.7	5.2

It will be seen at once that in density of population and in proportion of improved land, the rich soil area of the South is above the average for the whole country and the pine-barren region below, while the former is gaining more slowly than the whole and the latter more rapidly, so that conditions are tending to become more uniform throughout the country. The fact that the number of acres of improved land per inhabitant is less in the pine-barrens than elsewhere would seem at first to indicate a more intensive cultivation of the soil there; but another possible explanation is that in that region a considerable proportion of the inhabitants are still engaged in lumbering and other industries which do not involve tilling the soil, and import farm products from other regions. The slight decrease in the number of acres per inhabitant in all three regions in thirty years is doubtless correlated with the increasing efficiency of the farmers and the prevailing movement of population from country to city.

Few if any writers who have noticed the rapid development of the long-leaf pine country have mentioned what seems to be the principal cause of it. It is probably a common impression that the pressure of increasing population has simply forced farmers to the poorer lands, where by the exercise of thrift and care, by draining swamps, and by developing crops adapted to sandy soils, they have been able to make a living under somewhat adverse conditions. It has also been stated that some of the advantages of the sandy lands, such as salubrity, ease of communication by rail, abundance of artesian water, the ease with which the soil can be tilled in wet and dry weather, and scarcity of mud, dust, floods, droughts, and extreme cold, have not been fully appreciated until recently.

The abandonment of some of the rich uplands is commonly attributed to the Civil War, which liberated the slaves and upset the old plantation system generally, and at the same time lowed many clayey fields to be badly cut up by gullies du four years of idleness. Washing and gullying have undoubtedly done great damage in some places, not only during the war but before and since, but there are large areas of rich land not much subject to erosion, such as the red hills of northern Florida and the more level parts of the black belt of Alabama and Mississippi, and the stagnation of population and preponderance of old people and negroes is almost as marked there as in the badly gullied areas.

The discovery of the cause of malaria, at the end of the 19th century, has tended to make alluvial areas more habitable, but in the pine lands proper malaria has never been an important factor. The relative increase of population in the pine lands of Georgia was considerably greater between 1890 and 1900 than between 1900 and 1910.

As the long-leaf pine is one of the most useful of trees, and is by far the most abundant tree in the pine-barrens, the increasing demand for its lumber and resinous products from the manufacturing communities of the North and treeless areas of the West has given employment to thousands of people, laid the foundations for many new towns, and brought wealth to numerous "captains of industry." This undoubtedly has been an important factor in the development of the region under consideration; but where the production of lumber and naval stores has declined with the exhaustion of the forests the population has usually continued to increase at about the same rate, and it is now much greater than could be supported by forest industries alone.

In those parts of the world that have passed the pioneer lumbering stage and have not reached the manufacturing stage, as is the case in the greater part of the South today, economic conditions are generally pretty closely correlated with soil fertility, or were so correlated before the use of commercial fertilizers became common; and in the development of the fertilizer industry seems to lie the key to the situation.

Sandy soils in humid regions, and swamp soils other than those of alluvial swamps, are well known to be deficient in available plant food, and no intensive permanent agriculture is possible on such soils without liberal fertilization. Of the several elements essential to plant growth, only three are commonly regarded as so liable to exhaustion that they must be applied artificially, namely, nitrogen, phosphorus, and potassium. Potassium is scarce in most coastal plain soils and especially in non-alluvial swamps, and nitrogen is scarce in nearly all sandy soils that have little humus. The average coastal plain soil is perhaps as well supplied with phosphorus as the rest of the country is, but there are few soils that are not benefited by applications of that element after a few years of cropping.

The history of the fertilizer industry need not be gone into extensively here, but it may be said that the available supply of fertilizing materials of the kinds that were in use a century ago, such as stable manure, wood ashes, marl, gypsum, fish scrap, and bones, would be utterly inadequate for the amount of farming that is done in regions of poor soil today. The modern pine-barren farmer depends mainly on substances dug from the ground hundreds or thousands of miles from his fields, such as nitrate of soda, phosphate rock, and potash salts.

Previous to 1840, when Liebig published his epoch-making researches on agricultural chemistry, the use of fertilizers was very imperfectly understood, and besides there were hardly any railroads to transport these materials to points remote from navigable waters. And the discovery of some of the most valuable deposits of fertilizing materials came still later. By far the greatest known deposits of potash salts in the world are in Prussia, and these were not worked until the sixth decade of the last century. The mining of phosphate rock in the United States was begun in South Carolina about 1868, in Florida about 1888, and in Tennessee about 1893. Nitrate of soda, one of the most convenient sources of nitrogen, comes from Chile, and did not become a recognized article of commerce until about 1884. The use of all these substances in the pine country has grown by leaps and bounds.

No statistics of the use of each separate ingredient of fertilizers for areas smaller than states are available, but the government census reports give the total expenditure for fertilizers in each county for the year preceding the census year; and the ratio between that and the amount of land under cultivation, though varying considerably from year to year, is pretty constant for similar soils at any one period. The following table shows the amounts spent for fertilizers in the rich lands of the South, the pine-barrens, and the whole United States, per acre of improved land, per inhabitant, and per square mile of total area, in 1879 and 1909, in dollars and cents, and the percentage of increase in thirty years.

Expenditure for Fertilizers—

	Per Acre			Per Inhabitant			Per Square Mile		
	1879	1909	Increase	1879	1909	Increase	1879	1909	Increase
Rich lands...	$0.20	$0.63	212%	$1.11	$3.17	286%	$38.19	$160.04	319%
Pine-barrens .	0.39	2.08	428%	1.39	6.95	400%	16.17	170.28	953%
Whole U. S...	0.10	0.24	140%	0.57	1.25	219%	9.63	38.33	302%

The increase in expenditure for fertilizers is of course not necessarily proportional to the increase in amount used, for the prices of different ingredients vary from time to time; but the table shows plainly that the increase has been far greater in the pine-barrens than in other parts of the country.

The use of fertilizer per square mile increased more than ten-fold in the pine-barrens in thirty years, and that section now uses more of it to the square mile than the more densely populated rich uplands. Some counties in Florida now have an annual expenditure for fertilizers of over $30 an acre, or over 100 times as much as in the country as a whole, and Florida, which is nearly all pine-barren and swamp country, has increased in population and agriculture at a faster rate than any other eastern state, as would be evident if statistics of this kind were given for separate states.

Just now, owing to the war in Europe, it is almost impossible to get potash, and the supply of nitrate and phosphate has been affected somewhat; but even if the European supply of potash should be permanently cut off (and even before the war began there were some threats of restricting its exportation from Germany), American ingenuity would probably come to the rescue with a successful process of extracting potassium salts from feldspar or kelp long before agriculture in the South reverted to the condition of fifty or even thirty years ago.

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A PLEA FOR BETTER QUESTIONS

By Robert M. Brown
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In looking over tests in geography given to the grades in several American cities, I was struck with the similarity of the questions for the different grades in the same school system. This was especially true in one case where a number of the questions for grade VI and for grade VIII might easily be interchanged.

All the questions for the VI grade are printed below, and in a parallel column the VIII grade questions which relate to the United States are inserted. Four of the VIII grade questions not given in the text had no counterpart in the VI grade list although two of the four were on a par with the question of the earlier grade.

GRADE VI

1. Name five States that border on the Great Lakes.
2. Name the States that border on Mexico.
3. Explain the Florida Keys.
4. Describe the method of raising rice.
5. Name a State in which each of the following products is obtained: copper; lumber; wheat; tobacco; sugar.
6. Give an interesting fact about New Orleans; Minneapolis; Cleveland; Louisville; St. Louis.

GRADE VIII

1. Beginning at the north, name in order, the States that border on the Mississippi River, on the east and on the west.
2. Explain the Mammoth Cave.
3. Tell about the production of wheat.
4. Name a State that produces large quantities of rice; tobacco; Indian corn; copper; fruit.
5. Name a special industry of each of the following places: Minneapolis; Pittsburg; Seattle; New Orleans; Boston.

Teachers who have difficulty in realizing the stages of development which the subject of geography demands as the pupils proceed through the grades, may find some aid in *The Teaching of Geography* by B. C. Wallis (Cambridge University Press, 1915). Wallis applies the words, descriptive, transition, and argumentative, to the stages of teaching. He uses the first term (descriptive) to designate the key-note of the beginnings of instruction. This use of the term coincides in the main with the common use, but it should be clear that all geography is not descriptive and that other phases are presented in later grades. In our school system the curriculum of geography begins with home or observational geography; this is followed, after a study of peoples under different controls of living, by a brief survey of the world. Here ends in general the purely descriptive work and while it is not dropped entirely it no longer becomes the dominant aim. Wallis's second step, transition geography, has to do with investigations of geographic principles.

While the line between the transition and the argumentative stage is not definable it lies somewhere in the realm between the immature and the more mature mind. The work of the transition stage is a direct preparation for the later stage and may in general include the broader work of causes and effects and a knowledge of the conventional presentation of geographic information. In the United States this work generally includes the detailed study of the continents; but the extension of the transition stages over so long a time defeats the intent of the scheme. Many school geographies introduce a discussion of the Principles of Geography between a study of North America and South America. This chapter, without doubt, Wallis would call an introduction to his transition stage and a subsequent study of South America, applying these principles to a particular realm for verification, would complete this stage. To continue this type of treatment for all continents seems a waste of time. The examiner of the VI and VIII grade pupils quoted above believes, apparently, that all geography is descriptive and that it has no other aim than the accumulation of facts and in this the examiner has many followers, blindly following, among the teachers.

Wallis calls his third stage argumentative geography which differs from the transition stage in intensity alone. The experience gained in the use of geographical principles and conventions is now utilized for a broad survey of the world. Here he would go beyond the scope of the ordinary text book and gleam materials for use from any trustworthy source as census reports, consular reports, newspaper summaries, atlases, and the like.

This division of the subject matter into phases or stages is pedantic and teachers would discover difficulties in the way if they attempted to carry out the program in detail; on the other hand the plan does furnish guide posts to the teacher's path and clearly emphasizes the progressive character of the work. Wallis emphasizes his theory further by selected examination questions arranged under headings as topography, maps, climate, etc. Under topography,* his questions for the descriptive are of this type.

1. Where and what are Niagara, Chile?
2. Into what sea does the Danube flow?
3. What natural feature forms the boundary between France and Spain?

Questions involving location are not bad questions; they are good questions but they should not become a habit with a teacher. The danger in this type of question lies in the tendency of the teacher to ask for information concerning relatively unimportant places and to encourage a gazetteer-like acquaintance with names. Under the transition phase, are questions of this type:

Sketch a map of South America. Insert three rivers; shade and name three mountain ranges. Insert and name three large ports. Insert and number one parallel and one meridian. Indicate the scale of the map, approximately.

This question as well as most of the questions under the transitional stage insists on an ability to use the conventional symbols of the science and implies considerable training in this line. The type of question under the argumentative is not greatly different, but in the main it has an economic aspect:

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*Wallis uses topography as a synonym for place-names.

Make a sketch map to indicate the routes of transport of wheat from Winnipeg to New York.

But Wallis is not consistent in the division of his questions under his three phases and his scheme seems to fail in the application. It is however only an apparent failure, a recognition of the fact that the progress from stage to stage is a gradual one and that the descriptive phase extends further through the grades in one division of the subject, as in the topographic, than it does in another, as in the study of manufacturing. There is always the danger in outlining a course after this manner that the mechanics become the real issue. In recommending this plan to teachers, it is hoped that if they have not a better plan, they will catch the idea of progressive teaching consistent with the increasing maturity of the pupils and that they will abandon the plan of cramming names and data through the course of geography in the grades. Before leaving Wallis's book, observe other examples in his questions. Under climate:

Descriptive. Are mountains wetter or drier than the neighboring low lands? Why?

Transition. Two places A and B have the following variations in temperature and rainfall.

Months.....		J	F	M	A	M	J	J	A	S	O	N	D
Temp. in degrees F	A	-4	-2	15	39	52	62	66	63	54	41	21	5
	B	52	53	55	59	65	71	71	79	74	67	59	54
Rain in inches...	A	1	1	1	2	2	3	3	3	2	2	1	1
	B	4	3	4	3	1	½	—	½	2	4	4	4

State the districts in which these places might be, giving reasons for your answer.

Argumentative. Compare the climate of the Mediterranean with that of the British Isles.

In the last case teachers may say that this is a common question in the schools, but the answer is not to be found in trite explanations as, hot, cold, wet or dry, but in such a thorough investigation of the climatic controls and variations of the two areas that the resulting differences in occupations, customs, vegetation and the like are evident. It is not a question to be answered off-hand from generalized climate zones but one to investigated for the details of these zones.

The questions under the three phases for People and Occupations are somewhat similar, and unless the teacher realizes fully the desired progress of the pupils the questions may be answered in much the same words. Thus the descriptive question is—

Why are there so few people in the desert of Thar in the valley of the Indus, and so many people in Bengal in the valley of the Ganges?

The transition. Explain the difference in the density of population between Belgium and Russia.

The Argumentative,

Explain in detail why the population of the United States is roughly 14 times as dense as that of Canada; pointing out the circumstances in which these two countries are essentially similar and essentially different.

In all these cases I have chosen a question from a group and thus some injustice has been done. The entire list of questions supplied by Wallis is worth studying and stands as an index to his scheme of treatment.

In a recent book *How to Teach the Fundamental Subjects* by Kendall and Mirick (Boston 1915) there is a section on geography in which this matter of questions is discussed. The authors give a type examination in Geography in lieu of a long discussion in order to show the kind of thinking pupils ought to be able to do at the close of their geography work in the grades, and the kind of facts with which they ought to be familiar. The special feature of this test however is Part II, a list of questions to be answered by the use of the text books. This type of question or test is important. It is one of the aims in all of the branches—in geography, it has been called the atlas habit. Two questions of this list of five are printed:

1. Write a paragraph showing how the life of a boy or girl differs from your own in one of the following countries: (a) Japan, (b) England, (c) Cuba, (d) Russia, (e) India.
2. Compare Texas with Germany as to (a) size, (b) population, (c) industries, (d) wealth, (e) opportunities for education.

There are many such questions which arise as one reads papers and magazines and it is folly to expect that a geography course will equip the memory for all time. A little practice in the use of texts, atlases, readers, and other reference books will point out the way to the answers; the mental hazard will thus be easy but the physical hazard—laziness or love of ease—may still be difficult to overcome. In this book there may be found a discussion of the problem method of treatment, which it may be well to add is not a new method but a rejuvenated one. The recrudescence of the problem is in itself a plea for better questions. Kendall and Myrick's criteria for a good problem in geography are: "it should be worth solving; it should be within the mental capacity of the pupil; and each one should be of such a kind that its solution will make the pupil more skillful or more intelligent in solving the next one."

The Course of Study, Baltimore County Schools (Baltimore 1915) indicates many types of problems for the grades and concludes the geography section by a discussion of the problem-study procedure. For a more definite working out of the problem the teacher is directed to *Practical Exercises in Geography* by Sanford and Sutherland (Boston 1915).

All these emphasize the thought-provoking question as an aim in upper grade work. It is likely that the teacher will not agree entirely with the points of view of any of the writers above quoted but she must at least concede that the weight placed upon the question is not exaggerated. The next step forward is not the adoption of any standardized method of procedure but the realization, within the limits of the personal equation, of the advancing stages of the subject through the grades. There is no better test of the assurance of this than the type of question used. Strayer* gives these tests for the teacher's questions:

1. Were my questions clear and concise?
2. Did they challenge the attention of all members of the class?
3. Did children need to think, to organize their experiences?
4. Was the sequence good?
5. Was it possible for every child to answer some of the questions?
6. Did each child have a chance to answer?
7. Did the children ask questions?

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THE AIMS AND THE WORK OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

By The Editor

Now that the organization of the National Council is completed and state councils have been formed in more than half of the states, the question arises, "What is next to be done and how?"

From the beginning, the organizers of the movement have

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*A *Brief Course in the Teaching Process*, p. 116.

believed and still believe that the most effective work will be done through the state organizations, assisted by local committees. The National Council will suggest lines of work and the JOURNAL will gladly report what various states and cities are doing, thus giving others the benefit of the experience of those who are accomplishing results.

It is hoped that local committees and state councils will not wait for suggestions from national officers. The United States is a large country and anything like a nation-wide campaign conducted by a single national committee would involve much time and expense. The best results will inevitably be secured by those local and state groups that make their own programs and carry them out.

A plan to build up a National Council of 1000 members is now under consideration. Each state will, under this plan, be assigned its proportionate representation in the National Council. The state organizations will then be asked to canvass the situation in their respective states and, after careful inquiry, to select the best qualified people to make up the representation for their states, and recommend them for the National Council. Persons who have already united with the national organization will be included in these state groups which make up the National Council.

The cost of carrying on a nation-wide correspondence or of mailing literature to all members of the national organization would be too great for the executive committee to assume. It will therefore be necessary for members to watch the pages of the JOURNAL OF GEOGRAPHY for notices, announcements, etc. The JOURNAL has been made the official organ of the Council and all members paying their annual dues of $1.00 are entitled to the magazine.

THE PROBLEM OF FINANCES

The National Council has been financed during the past year by a generous gift of $100 from the American Geographical Society of New York and by 10 per cent of the annual dues paid by each member, 90 cents going to the Journal of Geography for the magazine which each member receives. As membership in the Council grows, it is hoped that the JOURNAL can be supplied at a still lower rate, thus increasing the amount turned over to the National Council for its use.

Several of the states are financing their state councils by collecting annual dues of $1.25, retaining 25 cents for their own use.

If the state councils are to do effective work, they must have at least a small amount of money for necessary expenses. This will probably have to be raised by securing as large a number of members as possible for the state organization, even though many of these persons do not at once unite with the national organization. Illinois, for example, enrolls members in the state council upon payment of 25 cents annual dues, and in both state and national councils upon payment of $1.25.

The Executive Committee feels confident that the state officers will find a way to raise the necessary money for carrying on their work.

LINES OF DESIRABLE ACTIVITY

(1) Nearly every state holds the annual meeting of its State Teachers Association in the fall. This is a favorable opportunity for getting the enthusiastic teachers of geography together and forming or strengthening the state organization. Each state leader should seize this opportunity for informing the teachers of his state regarding the renewed interest in geography teaching which is manifesting itself, and the organized effort that is being made to strengthen the position of geography in our educational system. Several states have arranged for Geography Round Tables at the State Teachers' Association meetings and several have provided for geography addresses on the general program or section programs. *Certain it is that geography will receive more attention at the teachers' associations this year than it has received in many a year.* This is due to the activity of a small group of devoted teachers in the various states.

(2) *Publicity* is necessary in any movement that seeks wide-spread support. A part of the machinery in every state should be a committee of ONE regularly to supply the educational papers and magazines of the state with news, notes, and occasional articles of a geographical character. Only thus can the great body of teachers be reached. This is a highly important phase of the work of the state organization. The selection of the right man or woman for this position is essential.

LOCAL GEOGRAPHY CLUBS AND SOCIETIES

Every large city and many small cities should follow the example of Chicago, Philadelphia, Minneapolis, St. Paul, Cleveland, Richmond and several other cities which have permanent geographical clubs or geographical societies. In some of these cities membership is practically confined to teachers, while in others, Philadelphia and Chicago for example, business men, professional men, and others have become actively interested. Cleveland has made a feature of its Saturday classes and excursions. Chicago has a very excellent series of lectures each year and also conducts field trips and excursions. In any city it may be taken for granted that at least one person in every thousand of the population can be counted upon actively to support a local geographical society if good leadership is available.

THE ULTIMATE AIMS

The building up of an organization, the securing of speakers for local and state associations, the increase of geographical articles in educational magazines and the enlisting of larger public interest in the subject of geography are mainly means to certain ends. One of these is the leading of school boards and superintendents to ask for teachers who have made adequate preparation for teaching geography. This will lead Normal Schools to give something like proper training in geography to teachers who go out to teach it. The Normal Schools are perfectly willing to provide the kind of teachers that the market demands. If teachers who can teach geography effectively are demanded, the training schools will soon take steps to meet the demand.

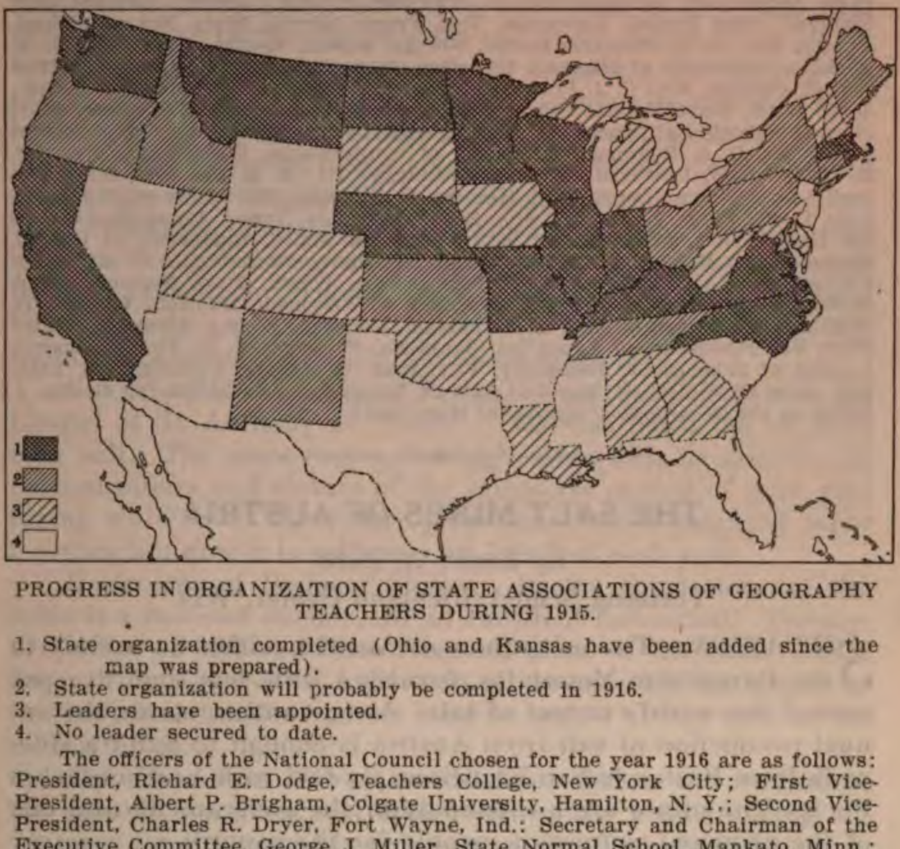
Another aim is to secure larger opportunities for prospective teachers to study geography in the colleges and universities. Fortunately, a most notable growth of geography is now going on in the higher institutions. At least two Middle Western universities enrolled more than 1000 students each in geography courses last year.

A third aim is to put renewed life and enthusiasm into the geography teachers that are now engaged in the work. The teacher and the spirit which she puts into her teaching are everything. If a wave of interest in geography is caused to spread over this country, thousands of teachers will catch the enthusiasm.

A fourth aim must be the continued careful study of the pedagogy of geography, the thoughtful framing of courses of study by committees of experts and the securing of better and better maps from our map publishers, and better and better books from our book publishers.

Already notable progress in this line is making. We are getting better maps and our school text books are the best in the world. The German and French elementary books are behind ours and the English school geographies are decidedly inferior to our best.

These are some of the lines of activity ahead of us and these are some of our aims. And now let us go to it!



PROGRESS IN ORGANIZATION OF STATE ASSOCIATIONS OF GEOGRAPHY TEACHERS DURING 1915.

1. State organization completed (Ohio and Kansas have been added since the map was prepared).
2. State organization will probably be completed in 1916.
3. Leaders have been appointed.
4. No leader secured to date.

The officers of the National Council chosen for the year 1916 are as follows: President, Richard E. Dodge, Teachers College, New York City; First Vice-President, Albert P. Brigham, Colgate University, Hamilton, N. Y.; Second Vice-President, Charles R. Dryer, Fort Wayne, Ind.: Secretary and Chairman of the Executive Committee, George J. Miller, State Normal School, Mankato, Minn.; Treasurer, Vernor C. Finch, University of Wisconsin, Madison, Wis.

The Executive Committee consists of the following:

George J. Miller, State Normal School, Mankato, Minn.; Richard E. Dodge, Teachers College, New York City; Charles R. Dryer, Fort Wayne, Ind.; R. H. Whitbeck, University of Wisconsin, Madison, Wis.; L. O. Packard, Boston Normal School, Boston, Mass.; James F. Chamberlain, State Normal School, Los Angeles, Cal.; Charles C. Colby, Peabody College for Teachers, Nashville, Tenn.; F. V. Emerson, University of Louisiana, Baton Rouge, La.; N. A. Bengston, University of Nebraska, Lincoln, Nebr.

The Board of Directors consists of the following: Jane K. Atwood, State Normal School, Emporia, Kan.; George A. Barker, State Teachers College, Greeley, Colo.; N. A. Bengston, University of Nebraska, Lincoln, Nebr.; C. T. Boggess, State Normal School, West Liberty, W. Va.; Dr. Isaiah Bowman, Director, American Geographical Society, New York City; Robert M. Brown, State Normal School, Providence, R. I.; J. E. Buchanan, State Normal School, Cheney, Wash.; E. J. Cable, State Teachers College, Cedar Rapids, Ia.; Frank Carney, Denison University, Granville, O.; James F. Chamberlain, State Normal School, Los Angeles, Cal.; W. W. Clendenin, Wadleigh High School, New York City; Dr. Collier Cobb, University of North Carolina, Chapel Hill, N. C.; C. C. Colby, Peabody College for Teachers, Nashville, Tenn.; Sumner W. Cushing, State Normal School, Salem, Mass.; President C. W. Daugette, State Normal School, Jacksonville, Ala.; Dr. F. V. Emerson, University of Louisiana, Baton Rouge, La.; O. W. Freeman, Fergus County High School, Lewiston, Mont.; Grant E. Finch, State Normal School, Dillon, Mont.; R. P. Green, State Normal School, Bowling Green, Ky.; Dr. R. S. Holway, University of California, Berkeley, Cal.; Mark Jefferson, State Normal School, Ypsilanti, Mich.; President Willis E. Johnson, State Normal and Industrial School, Aberdeen, S. Dak.; Loulie C. Kelley, John Marshall High School, Richmond, Va.; Frank Merrill, State Normal School, Athens, Ga.; L. O. Packard, Boston Normal School, Boston, Mass.; Dr. A. E. Parkins, University of Missouri, Columbia, Mo.; E. E. Philbrook, State Normal School, Castine, Me.; C. J. Posey, University of Minnesota, Minneapolis, Minn.; C. E. Pratt, State Normal School, New Britain, Conn.; Ernest E. Rase, State Normal School, Baltimore, Md.; Joseph Reed, State Normal School, Lewiston, Idaho; Dr. G. B. Roorbach, University of Pennsylvania, Philadelphia, Pa.; Dr. R. D. Salisbury, University of Chicago, Chicago, Ill.; B. H. Schockel, State Normal School, Terre Haute, Ind.; Howard E. Simpson, University of North Dakota, Grand Forks, N. Dak.; Bolton Smith, Memphis, Tenn.; James Smith, Austin High School, Chicago, Ill.; Dr. Warren D. Smith, University of Oregon, Eugene, Ore.; Mabel Stark, State Normal University, Normal, Ill.; C. H. Taylor, University of Oklahoma, Normal, Okla.; Alice Wessa, State Normal School, Buffalo, N. Y.; R. H. Whitbeck, University of Wisconsin, Madison, Wis.; G. H. Whitcher, State Department of Education, Concord, N. H.; Alvan N. White, State Superintendent of Education, Santa Fe, N. Mex.; W. H. Young, Superintendent of Schools, St. Johnsbury, Vt.; Anna Youngberg, University of Utah, Salt Lake City, Utah.—(Map and List of Names from an article by George J. Miller in the *Geographical Review* of May, 1916).

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THE SALT MINES OF AUSTRIA

By Emily A. Budd

Training School, Richland Center, Wis.

SITUATION. The salt mines of Austria, which lie mainly in the Carpathian Mountains, furnish a little less than five per cent of the world's output of salt. As one author states, the annual production of salt from Austria is enough to build a sidewalk from Boston to San Francisco, six feet wide and six inches thick. The mines are a monopoly of the government, and one of the principal sources of income for the country.

Occurrence. In many places there once existed salt lakes or arms of the sea, whose waters in the process of time have disappeared, leaving the salt. Changes in the crust of the earth have buried these deposits under deep beds of sedimentary rock, and rock salt as hard as coal has been formed.

Mines and Methods of Mining. The usual way of obtaining salt in this country is from brine wells. A well is bored down into the deposit. Water is forced down to dissolve the salt and this brine is forced to the surface, evaporated by the sun or artificial heat, leaving the salt crystalls. In the most up to date mines a double tube pipe is used, the fresh water going down in one while the brine is pumped up through the other. Sometimes salt is obtained from natural brine springs. A third method is by mining.

Wieliczka Mines of Austria. A few miles from Cracow is a little town, Wieliczka, which is built on the roofs of the great salt mines beneath. These salt mines are the most wonderful in the world. To descend into these mines one may go by means of a great staircase carved out of solid salt or by means of an elevator. This mine has been quarried into chambers that lie in seven stories, one above the other. Each chamber is connected by horizontal passageways and the stories by winding stairs.

One gallery opens into a splendid ball room, three hundred feet long, ninety feet high with ceiling, pillars and chandeliers all of sparkling, glistening salt. Statues of Vulcan, Neptune, and other mythological persons adorn the room. At one end a rude throne has been constructed, for the use of the Emperor, should he ever honor any of the festivities with his presence. One ball room has been used for social functions since 1814.

Chapel of St. Anthony of Padua. Near the ballroom is the Chapel of St. Anthony of Padua. This was hewn out of solid rock salt. The great organ, the high altar with its crucifix, its twisted pillars and statues of the saints are carved of pure glistening white salt. In former years mass was celebrated every morning but now it is held only on July 3 of each year.

Underground Railway Station. In the third story of the mine is a railroad station and an excellent restaurant. Twenty-five miles of railroad lines from all parts of the mine center here. The restaurant is kept open all summer for the benefit of tourists; four hundred guests may be seated at one time at the dining tables.

The Dead Sea. Seven hundred feet below the surface of the ground is a great salt lake. One of the most thrilling adventures for the tourist is to ride over the thick dark waters in a boat which is guided through the various caverns by ropes and pulleys.

Kaiser Franz Chamber. This room is two hundred feet long and it contains two immense pyramids carved and ornamented in honor of a visit of the emperor and empress.

Export. Austria has many other salt mines and brine wells. The deposits of salt are said to be inexhaustible. In 1905 Austria produced 609,572 short tons of salt. In one of the mines a plant has been installed for the making of salt briquettes. The moisture is pressed out so that only about one per cent remains. These are made chiefly for export to tropical countries.

THE AUSTRALIAN BARRIER REEF

THE Great Barrier Reef of Australia is one of the wonders of the ocean world. Its marvelous structure and extent were first brought into prominent notice by the famous explorations of Captain Cook. Imagine a broken line of beautifully colored coral formations extending for 1250 miles, and varying in width from 5 to 75 miles. Picture, if you can, a field of wonderfully shaped corals, growing in great profusion and confusion. Extend this field for miles and miles, as far as the eye can see and beyond. Place in your picture hundreds of coral-bound bays and lagoons, each with birds of gorgeous plumage hovering about and above them. Add a tropical climate, and you will have created, in a meagre fashion, a view such as you would see should you visit the Great Barrier Reef of Australia.

The reef skirts the northeastern coast of the continent, and is separated from the mainland by an expanse of shallow water averaging 30 miles in width. In position, it corresponds to the barrier beaches off the eastern coast of the United States, but unlike the monotinous sand-dunes of the barrier beaches, the barrier reef is full of variety. Its irregularities are due to innumerable openings and channels. The outer edge of the reef is really a chain of detached reefs of variable lengths, only a few of the passages between which are of sufficient depth for ocean vessels. The British government has charted the navigable passages and they are now used very extensively.

The enclosed waters between the outer edge of the Barrier Reef and the mainland represent an expanse of 80,000 square miles. The entire area is really an archipelago of detached reefs and coral islets, the majority of which are completely submerged or only partially exposed to view at ordinary low water. The linear chain of reefs, together with the inumerable secondary reefs, constitute a natural breakwater, making of this area a tranquil inland sea which the largest ocean steamers traverse. Due to the intricateness of the passages, however, a large staff of efficient pilots is necessary to guide the ships. As a further precaution against danger in navigation, an excellent system of lighting and beaconing has been established by the Queenland government.

This most colossal of all coral formations was built up by tiny soft-fleshed polyps of multitudinous forms and colors. Darwin established the theory that a subsidence is necessary to produce the reefs, and that the coral formations are built up from the higher submerged elevations that fringe the mainland. This hypothesis is supported by most explorers and investigators, and all are now pretty well agreed that the great reef came into existence in that manner.

C. E. GRANGER.

AN EXPERIMENT IN CORRELATION

By V. C. Bell
Harrison Technical H. S., Chicago

ABOUT two years ago it occurred to a few of the teachers of commercial subjects at the Harrison Technical High School (Chicago) that it might be possible to work out a successful and profitable scheme by means of which the work in at least a few of the commercial subjects could be correlated. We feel that we not only succeeded in correlating commercial geography, commercial English, and typewriting primarily, but, incidentally, commercial art, stenography, and library study.

We are fortunate in having a branch of the Chicago Public Library in our school building and so we have an advantage over many others in reference work and supervised library work. The scheme is as follows:

1. The commercial geography department furnishes the subjects for discussion and the work begins there.

2. During the first semester, after a thorough study of some one product the instructor assigns to each member of the class both a topic to be written up and a graphic exercise; these are chosen from an outline which is worked out in class. This outline is then sent to the teacher of commercial English that he may know what is expected in the way of a discussion.

3. Each class works up a different subject each semester.

4. After the topics have been assigned a reading list is posted, and a note sent to the librarian stating the subjects on which references will be needed. She is then in a position more materially to assist the student when he comes for references. Commercial geography is a sophomore subject according to our course of study, but many sophomores are unable fruitfully to use either an index or a table of contents; hence a word or two of advice from the librarian saves much waste of time and energy, in addition to teaching the proper use of a reference book.

5. After the reading has been done and the notes taken, the English teacher assists in outlining the individual topics, and the resulting composition becomes a "chapter" in the "book" which the class thus writes on the product.

6. The compositions are first graded by the teacher of commercial geography—for geographic facts only; it is then sent to the teacher of commercial English, and finally to the typewriting teacher—each in his turn grading the paper, the three grades appearing on the first sheet of each "chapter" in a space prepared for the grades.

7. The papers finally return to the commercial geography department where a table of contents and an index are prepared, and the "book" goes into the list of reference books and display work of the department.

8. The cover of the "book" is drawn by a student from the commercial art classes, by one of the students of the class writing the "book", if possible.

9. When a student has finished his typewriting manual the teacher of typewriting sends to the commercial geography department for extra work for the student; in this manner we make typed copies of magazine articles, and file them for class use; we are also able thus to put into the hands of all the students at once clippings which would otherwise be available to only one at a time.

10. The stenography teacher uses assigned magazine articles on commercial geography subjects as dictation material; the wild scramble for the one library copy of the article is thus avoided, as the typed copy is handed in to the stenography teacher by each student in her class, and then comes to the commercial geography department.

11. During the second semester a second "book" on some nation is similarly worked up.

We feel that quite a little improvement in all lines of work correlated has come from this scheme, and that results justify the work.

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PERU—ITS PRODUCTS AND POSSIBILITIES

ONE not thoroughly familiar with the geography of the West Coast of South America has a series of surprises in store for him. In the first place, strange as it may seem, the coldest day of our trip South, after leaving the coast of the Carolinas, was that crossing the equator. Instead of bright, balmy tropical weather, the skies were usually overclouded and the air cool and snappy all the way down the 1,000 miles of Peru's long coast line, though it lies wholly within the tropics. This is due to the effect of the Humboldt current, a great Antarctic stream which follows the coast northward to a point above the Equator and is comparable with the Gulf Stream of the Atlantic in its far-reaching effect on climatic conditions, though the effect of the Humboldt current is just the reverse of that of the Gulf Stream. It is this feature of Peru's climate which explains the common expression that Peru is a "white man's country," for while geographically it is tropical, climatically it is a temperate country.

But this cold ocean current is at the same time a curse to the country, in that it prevents any rainfall from the Pacific breezes, the land being warmer than the water, while the high wall of the Andes prevents the rain-laden winds from the Atlantic reaching the West Coast. People along this coast speak of a rainfall fifteen or twenty years ago as one might speak of an earthquake in New York.

As a result of this we have a vast strip of land between the ocean and the coastal range, about two thousand miles long, including both Peruvian and Chilean territory, and from fifty to a hundred miles wide, which in climate, in fertility of the soil, and in other respects, is the equal of the narrow strip of our own country bordering the Pacific—except for lack of water. "Water, water," is the great cry of the sparse population that is found in this region. Every available stream that trickles down from the snow-capped mountains is husbanded, and when turned upon the land renders it a veritable oasis.

On the slow coasting steamers that ply from port to port, it will take one ten days to make the journey along Peru's extended coast. The ten or a dozen small ports, besides Callao, at which steamers stop, invariably mark the mouth of some small river which waters a fertile valley behind, but as often as not the water will all have been used in irrigation before reaching the ocean's edge or will have disappeared in the porous sands several miles inland. It is on the oases produced by these rivers, dotted along the great coastal desert, that Peru grows practically all of her agricultural products, her sugar, her cotton, rice, fruits, etc., and it is here that her cattle are grazed. Of the agricultural products sugar is now king, although, in normal times, cotton is a close rival.

The Cerro de Pasco Mining Company, a large American enterprise, is at work up on the high plateau, at an altitude of 14,000 feet, and is accomplishing marvels in the mining of copper. It has meant, however, the investment of millions of dollars of capital, the building of railroads, the opening of coal fields, and the development of the copper mines on a gigantic scale, to say nothing of waiting fifteen long years for any returns. But now this concern is producing 75 per cent of the copper exported, and, aided by the present unparalleled prices of this metal, is entering upon a stage of well-merited prosperity. Peru's annual production of copper is now over $10,000,000.

Outside of its minerals, the cane sugar industry of Peru has been the basis of much of the country's wealth, and has been the chief hope of forward-looking Peruvians. For Peru's sugar land surpasses all other sugar producing countries, except Hawaii, in the acreage yield of sugar.—[Excerpted from *The Americas* for June.]

THE SUEZ CANAL

By Genivera Loft

University of Wisconsin, Madison

THE construction of the famous "ditch in sand" known as the Suez Canal marked a triumph of diplomacy rather than of engineering skill. Before its promoter, Ferdinand de Lesseps, could have the work of excavation started he had to secure the consent of the Viceroy of Egypt, and this had to be given against the wishes of the Egyptian people. In addition he had to overcome the obstacles placed in his way by the British and had to persuade prospective stockholders that the accounts of difficulties existing in the canal zone were unfounded.

The work of digging the Suez Canal began in 1859 and was completed in 1869. Nearly all of the material to be removed was soft, and the line of the canal extended through an extremely flat region; excavation was, therefore, not a difficult matter. Under the original agreement the Egyptian government was to supply 80% of the labor. This led to a system of forced employment, and when about one third of the work was completed the Viceroy interfered and the use of forced labor was abolished. This was a very fortunate occurrence for the canal company since it led to the introduction of power dredges and other machinery, and hastened the work greatly. Previous to this the material had been scooped by hand into the baskets in which it was carried away. The total cost of construction was about $100,000,000, or $1,000,000 per mile.

The canal had a width of 328 feet at the water line and 190 feet at the base and has an average depth of 26 feet. Since there is no appreciable difference between the levels of the two bodies of water which it connects, there are no locks. It has been widened and deepened since it was first constructed so that now ships may pass at any point.

In 1887 electric lights were installed so that ships might use the canal at night. Retaining walls have been built in some places and it is planned to have them along the entire length of the canal. So unstable are the sandy banks that vessels have to reduce their speed greatly in order to prevent the sides from being washed away.

There are no slides to interfere with the passage of vessels but the wind carries so much sand into the channel that dredges are at work constantly to prevent its being filled. From 14 to 18 hours are required for the passage through the 100 miles of the canal.

USE OF THE CANAL

The canal was opened at about the time that sailing vessels were being generally replaced by steam ships. The great saving in distance which it effected caused it to be used by the large vessels and resulted in a decline in the use of sailing ships. It reduces the distance from England to Bombay over 6,000 miles, and the distance from New York to Bombay 2,500 miles.

During the first years in which the canal was used it did not pay expenses but by 1876 it was being used by over 1400 vessels. At the present time, under normal conditions, about 10 vessels per day pass through it, and two-thirds of them are British owned. Of the separate lines the Peninsular and Oriental is the largest user.

CONTROL OF THE CANAL

In 1875, through the strategy of Disraeli, the majority of the shares of the canal company passed from the hands of the Viceroy of Egypt into the control of British capitalists. This has led to the extension of British authority in Egypt so that it is now virtually a part of the British Empire. In 1888 the neutrality of the canal was guaranteed. England does not police the zone nor does she possess any privileges not enjoyed by other countries, and there are no preferential tolls for British ships.

The greatest benefit which the canal has given Great Britain is the connection which it affords with India. Together with Gibraltar, Malta and Aden, it enables Britain to dominate the Suez-Mediterranean route. This route offers an outlet for the products of India and allows her to enjoy the benefits of the railroads and other improvements which have resulted from the British regime. As a result of the improvement in communication between England and India the influence of England is more effective and the bond between the two has been greatly strengthened. The importance of the canal to Indian commerce is shown by the fact that about 50% of the traffic is accounted for by that country.

It is evident that it is a matter of great importance to England that the control of the canal shall not pass into the hands of her enemies. It is not because her ships enjoy special privileges that Great Britain must continue to dominate the situation but it is necessary that she hold the canal to prevent interference with her trade in times such as the present.

By strengthening the commercial ties between the Occident and the Orient the Suez Canal has benefitted practically all nations. It has been to the advantage of all interested in the canal that it has been, since 1875, under the control of a nation whose power is so respected that no disturbance or interference with shipping have been possible.

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CURRENT MATERIAL FOR THE GEOGRAPHY TEACHER

THE SAHARA IN 1915

The exploration of the Sahara has been carried on, mainly by the French, with persistent energy during recent years. At the same time European control, not only of the Sahara itself but of the surrounding regions, is causing many changes in the social and economic conditions of the desert. . . .

The old notion of the Sahara as a boundless waste of shifting sand—a dried-up ocean-bed below the level of the sea—persists in many minds, and is fostered by tourists whose only knowledge of the desert has been gained by a visit to Biskra. This notion owed its rise to very natural causes. Approached from Egypt or the Barbary States, the only directions from which it was approached by civilized man until recent times, the Sahara does present almost everywhere a waste of sand, and much of it shifting sand. . . .

The size of the Sahara is indeed hardly realized. It covers approximately 3,500,000 square miles and is not much inferior in area to the continent of Europe. Though sand extends over probably 700,000 square miles, rocky plateaus and not sand-dunes are the chief characteristics of the desert. If a generalization be attempted, the Sahara may be described as a great tableland scored by the beds of dried-up rivers, diversified by mountains and depressions, and fringed by a deep belt of sand west, north, and east. . . . The higher plateaux and the mountain ranges occupy a central position and extend across the Sahara northwest to southeast. This elevated region is sometimes spoken of as the bridge connecting the Mediterranean lands with Central Africa, the means by which early man spanned the desert. . . .

In the central Sahara there is comparatively little sand . . . and somewhat more favourable conditions prevail in parts of the plateaux and mountains of this region. Between the granitic and sandstone hills, are wooded hollows and extensive pasture lands, and though there are no perennial rivers, the watercourses are filled during the rainy season (August to October). . . .

Though water is—for the Sahara—plentiful, and portions of the southwestern Sahara support large herds of cattle, sheep, and goats, there are no permanent streams. . . . The hinterland of the region between Cape Bojador and the Wad Draa . . . is also tableland, and is probably better provided with pasture than the uplands farther south. It is the home of the great raiders of the western Sahara.

. . . The Moroccan Sahara is taken to be the country south of the High Atlas; . . . it is a land of promise as it contains three rivers which are never completely dry. These rivers, as they descend from the High Atlas, turn south-west and make for the Atlantic, though of the three only the Draa reaches the sea. . . . —[From the *Geographical Journal*, Nov., 1915.]

PROSPEROUS YEAR FOR MINES OF THE UNITED STATES

The midyear review of mining conditions reported to the Secretary of the Interior on July 1 by the Director of the United States Geological Survey is well supported by the preliminary reports for the year submitted Jan. 1. The Geological Survey is making public its usual estimate of mineral production for 1915 in the form of a separate statement for each of the more important mineral products.

A review of these statements confirms Secretary Lane's comment of last July to the effect that the mining revival is in full swing. In the Western States alone the metal production shows an increase in value of more than $130,000,000 over the corresponding figures for 1914; and the year's increase in output for the principal metals measured in value is more than $250,000,000. Moreover it is not unreasonable to expect that when the full returns for all mineral products are compiled they will show that 1915 was the country's most productive year in the mining industry. The total may even reach two and one-half billion dollars.

The copper mines passed all records for previous years, the 1915 output having a value of $236,000,000, or $83,000,000 more than the value of the production for 1914. Only twice in the history of copper mining has there been a larger increase in quantity of metal produced.

The total shipments of *iron ore* from the mines in the United States in 1915 are estimated to have exceeded 55,000,000 gross tons, an increase over 1914 of more than 38 per cent. The increase in *pig iron* is estimated at 6,500,000 tons, with a total increase in value of pig iron production of more than $120,000,000.

The output of zinc (spelter) made from domestic ores was larger than ever before, being worth $120,000,000 as compared with $85,000,000 in 1914.

The production of *bituminous coal* and *anthracite* in 1915 is estimated to have increased between 4 and 5 million short tons, or less than 1 per cent. The quantity of bituminous coal mined increased about 6½ million tons and that of anthracite decreased over 2 million short tons.

Preliminary estimates of the total output of *petroleum* in the United States in 1915 indicate a slight increase over the corresponding output in 1914. It is believed that the total petroleum yield of the United States in 1915 amounted to 291,400,000 barrels.

The estimate of *Portland cement* output in 1915 indicates shipments from the mills of 86,524,500 barrels, an increase of one-tenth of one per cent over 1914.

Perhaps the most notable item in the year's record is the stimulation of metal mining in the Western States. Almost without exception the increases in production were large and in several States 1915 was the best year on record. In Arizona, which leads in copper, the output of that metal exceeded the previous record production of 1913. California continues to lead in gold and had the largest yield in 32 years, and with one exception in half a century. In Montana and Arizona record outputs of silver are reported and in Alaska the increased production of gold and especially copper made 1915 a much more prosperous year than even 1906 when Fairbanks and Nome were yielding their greatest returns of gold from bonanza placers.—[*Bulletin U. S. Geol. Survey.*]

RESOURCES OF WYOMING

Wyoming is a State of large resources, whose development has only begun. Within its 97,594 square miles lie the most extensive coal and oil fields of the Rocky Mountains, thousands of acres of irrigated and dry-farming lands, and extensive areas of splendid stock range; moreover, some of the finest fishing and hunting in the United States can be found within its borders. Although the precipitation averages only 12½ inches a year, the many irrigated areas are highly productive, and the success which dry farming has here and there attained seems to indicate that a still larger area may be brought under cultivation of that kind.

Among the mineral products of the State coal is preeminent. Its coal fields cover about 41,500 square miles—two-fifths of the State's area—and contained originally an estimated 670,723,-

000,000 tons. Of this quantity only 178,000,000 tons, or about one-fortieth of 1 per cent, has been exhausted. The production in 1913 was 7,393,066 tons, valued at $11,510,045.

The second in value of production among the mineral resources is oil, of which 2,406,522 barrels, valued at $1,187,232, was produced in 1913. The production in 1914 amounted to about 4,600,000 barrels, equal to more than 60 per cent of the production of Pennsylvania for the same year, and places Wyoming, whose oil fields are newly discovered and only partly developed, in the ninth place among the oil-producing States of the Union.

Other minerals, including gold, copper, iron, gypsum, limestone, sandstone, marble, brick, clay, and mineral waters, brought the value of the State's mineral production in 1913 up to $13,682,091. Among the undeveloped resources are bituminous shale, volcanic ash, graphite, asphaltum, manganese ores, bentonite, tin, salt, bismuth, and perhaps most important, phosphate rock, on which the future of American agriculture may largely depend. It is estimated that more than 1,250,000 acres in Wyoming are underlain by workable phosphate deposits, a phosphate area greater than that of any other State. (Overland Guidebook, Bulletin 612, U. S. Geological Survey.)

A Sample

Editor of the Journal of Geography:

I wonder if the Journal might be interested in some of the answers given by applicants for *licenses* to teach in the state of ——— to the question, "*Why does latitude influence temperature?*" The following are given verbatim:

"The latitude influences the temperature because the wind which blows from the north brings down a cool current and a wind which blows from the south carries a warm current so the state that lies in a latitude direction is warmer than one that lies in a longitude direction."

"Latitude has an influence on temperature because of the distance of the earth from the sun and some countries in the same latitude are in different zones."

"Latitude does not influence climate, they are lines which have been drawn to locate places."

"Latitude influences climate because the trade winds blow in from the ocean and the farther north one travels the stronger he will find the winds."

"Latitude is from east to west and as you near the equator the air becomes warmer."

"Latitude divides the world into zones and each zone has a different temperature."

In about two hundred and fifty papers I think I found only three which stated that the latitude influenced the length of day and night and the angle of the sun's rays.

Yours truly,

And these are the answers of candidates for licenses to *teach* geography. —*Editor.*

YOUNG AMERICA'S NEED OF GEOGRAPHY

An inquiry by the National Foreign Trade Council shows that many concerns engaged in foreign trade fill positions with foreigners when they would prefer young Americans if young Americans were available. They are not, because, for one thing, young Americans are not much tempted by foreign trade. That generally involves residence abroad, and they would rather reside here. Probably the young Pennsylvanian is sufficiently adventurous to be tempted by a job in Oregon, and the young Oregonian would find an opening in Pennsylvania attractive; but Argentina leaves both of them cold.

Another obstacle is general lack of any training for a foreign post. High school or college may have bestowed a smattering of French, German or Spanish; but commonly it is a very sparse, unserviceable sort of smattering. General ignorance of geography is conspicuously mentioned in the report. High school or college may have left an indefinite impression that Argentina is an extensive country in South America, but there is virtually nothing in the young American's mind that enables him to imagine Argentina as he can imagine Oregon or Pennsylvania. It is mostly just a misty void to him; and misty voids are not attractive.

Now if the young American had some real knowledge of the language of the country, and some real knowledge of the country itself, his imagination would take hold of it. Often, without doubt, the adventure would tempt him. It all comes back to a pretty complete lack of training for any foreign field. If we are to cut a far greater figure in foreign trade, young Americans finally must be able to imagine foreign countries to a greater degree than they do now. Teaching of foreign languages and geography should be got out of the smattering states.—[Editorial *Saturday Eve. Post.*]

COPPER PRODUCTION

In the following table the production for 1915 is apportioned to the States in which the copper was mined.

Production of copper in the ten leading states in 1914 and 1915.

(Smelter output, in pounds fine.)

	1914	1915
Arizona	382,449,922	432,467,690
Montana	236,805,845	268,263,040
Michigan	158,009,748	238,956,410
Utah	160,589,660	175,177,695
Alaska	24,985,847	70,695,286
Nevada	60,122,904	67,757,322
New Mexico	64,204,703	62,817,234
California	29,784,173	37,658,444
Tennessee	18,661,112	18,205,308
Colorado	7,316,066	7,272,178
Total for United States	1,150,137,192	1,388,009,527

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NEWS NOTES

Miss Mabel Stark, chairman of the Illinois Council of Geography Teachers, added 50 new members to the Illinois Council from among the teachers at the summer session of the Normal University at Normal. Twenty-five of these also enrolled in the National Council. Added to the enrollment which Miss Stark had previously secured, it is probable that Illinois is now nearly if not quite the leading state. She has arranged for the publication of a 4-page leaflet each month "to disseminate geographic notions, council announcements, etc., throughout the state." The first of the leaflets will be a resume of the national and state councils: the past, the present and the future of the Illinois council.

The Editor of the JOURNAL is scheduled for addresses on Geography before the state teachers associations of Massachusetts, Nebraska, Kansas, Minnesota and Wisconsin, during November.

Announcement is made of the organization of a new map publishing company known as the Denoyer-Geppert Co., of Chicago. Both men were formerly in the service of A. J. Nystrom and Co., map publishers, Chicago. Mr. Denoyer was earlier in charge of the department of geography of the La Crosse, Wis., Normal School.

Miss Zonia Baber of the department of Geography, School of Education, Chicago University, has an article on "The Ocean; Our Future Pastures" in the September *Scientific Monthly*.

Mr. Stephen S. Visher of the Moorehead, Minn., Normal School has an illustrated article on "The Biogeography of the Northern Great Plains" in the August number of the *Geographical Review*.

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RECENT PUBLICATIONS

THE ORIGIN OF THE EARTH. By Thomas Chrowder Chamberlin. The University of Chicago Press, Chicago, 1916. xi+262 pp.

This book is a contribution to the University of Chicago Science Series. It is written "not only for the specialist but for the educated layman." The highly philosophical subject is treated without great modification of Prof. Chamberlain's usually rather difficult style. It is certainly not the type of popular science book the principles of which one may expect to assimilate at one sitting.

The principles set forth have mainly been presented in certain chapters in the author's text-books of geology and in technical articles. They are here re-presented together with the incidents which led to their formulation. The book is the story of the "search for the mode by which the earth came into being." The discussion begins with the relation of the nature and physical behavior of gases to theories of earth origin, particularly the Laplacian hypothesis. Then follow evidencies obtained from astronomical studies which bear upon theories of earth origin. Subsequently, in considerable detail, a description is given of the mechanical processes by which the material of our solar system may have originated and evolved and by which the earth may have developed its present mass and major features and have come to be the home of living things.

V. C. FINCH.

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ECONOMIC ASPECTS OF INLAND WATER TRANSPORTATION

By H. G. Moulton

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I. The Agitation for Waterway Improvement

WE have been witnessing for many years in this country a very powerful and persistent agitation for the rehabilitation and improvement of water transportation. The movement began as long ago as 1895, and by 1903 had gained enough momentum to vote an appropriation of $101,000,000.00 for the improvement of the Erie Canal in New York. But the widespread and popular interest in the improvement really dates from 1906. In that year two history-making meetings were held, the St. Louis Convention and the Washington session of the Rivers and Harbors Congress. Out of the former grew the organization known as the Lakes-to-Gulf Deep Waterway Association; while the latter led to the appointment by President Roosevelt of the Inland Waterway Commission.

This commission made an extended investigation of waterway possibilities in the United States, ending with a memorable and joyous excursion down the Mississippi in 1907, with President Roosevelt as the guest of honor. "On the average each river town showed more spectators standing out to salute the presidential party than the entire population; while day and night the air was rent with acclamation of voices, steam whistle, shrieking siren, salvo of guns, and roar and rattle of fireworks." There followed a veritable harvest of Congresses and Conventions in a score of states, and there has been but intermittent abatement of zeal in the ensuing years. The question has been at times of absorbing political interest. In New York in 1903 the referendum on the Erie Canal proposition called out the largest referendum vote ever known; while in Illinois waterway appropriation has been the prize around which has centered for years a bitter struggle of rival leaders and political factions which has disgraced the very name of the state.

In the way of practical achievement the agitation has resulted in the appropriation of $101,000,000.00 for the enlargement of the Erie Canal, already noted; a congressional authorization of the improvement of the Ohio River at cost of $60,000,000.00; and the recent passage of a bill in Illinois providing for the improvement of the old Illinois and Michigan Canal as a connecting link between the Drainage Canal and the Illinois River; and numerous appropriations for minor projects in pursuance of our congressional policy of "pork barrel" legislation.

There remain as yet without financial backing a veritable host of projects, some definitely outlined and surveyed, others ill-defined and more or less chimerical, the total cost of which would reach many hundreds of millions of dollars.

The causes and influences lying back of this widespread and ambitious program are peculiarly interesting when studied in connection with the economic aspects of the transportation problem. The movement is a very illuminating example of the utterly haphazard and ill considered way in which we attempt to promote the general welfare through the agency of government.

II. Causes for the Movement

As to causes, the waterways movement appears to be a part of the general movement for the conservation of our national resources. Our waterways are conspicuous reminders of our improvident past. Quoting a recent writer, "At Cincinnati and Pittsburg hundreds of boats have given places to tens. Where once on the Missouri there were sixty, there now remains but one to remind us of the departed glory of our waterways. Along our wharves—old gang-planks, anchors, and broken machinery are tangled in the grass growing in the crevices between the cobblestones." Railways parallel the banks of great rivers, deserted save for a few small boats of uncertain schedule, or they run in the very channels of abandoned canals. Such spectacles compel reflection, and they recall the early days of water transportation in this country. There is a lingering glory about our great navigable rivers and inland seas that is not easy to dissipate. The waters which led Fathers Marquette and La Salle to the heart of an unexplored continent, the rivers which carried the American pioneer beyond the Alleghenies to the great Middle West, and on whose banks he built his home and reared his family are associated with a most romantic history.

Again, the very great part waterways played in the actual development of our country prior to the Civil War has served as a powerful influence in support of their resuscitation. In our early history they long served as the chief unifying agencies in our national life as well as the great avenues of commerce. Where canals were built, villages and cities sprang up as by magic, wealth poured into the contiguous territory, and industry thrived in the entire region. Today the inhabitants along proposed water routes again see visions of reviving industries, of booming towns and cities, of fleets of barges laden with the commodities of commerce borne swiftly along the surface of the waters. It is an alluring picture; and it is widely believed that all that is needed to make that picture a reality is the improving and connecting of our rivers and lakes.

Waterways and Lower Freight Rates

But by far the most potent force for waterway development is the argument that water transportation is decidedly cheaper than rail transportation. Various estimates of the great reduction in transportation charges to be effected by means of waterways have been made and it is generally believed that the cost of water transport is but a fraction of that by railway, the estimates varying from one-half to one-tenth and even one-fourteenth. Such convictions obviously furnish to the advocates of waterways the most practical of campaign weapons. Note: I am merely giving here the popular impression. The truth of the contention remains to be tested.

Accompanying the belief that water transportation is inherently more economical than railway transportation is the conviction that the railroads having monopolized the transportation of the country, are charging extortionate rates, which an unwilling but helpless public must pay. It is pointed out that wherever railroads are subjected to water competition the rates are substantially lower than elsewhere; that the water rates on grain from Buffalo to New York are about one cent a bushel higher than when the Erie Canal is open. The railways should therefore be subjected to competition from Government waterways. Whether the waterways carry the traffic or not, the potential water competition will force the railroads to carry at a low rate, to the benefit of American shippers. Waterways are, consequently, a means of railroad rate regulation.

European Experience with Waterways

Finally, the example of foreign waterways has had a great influence upon the movement in this country. It is well known that in Germany, France, and Belgium waterways have continually served as public carriers. They exist along with the railroads, apparently complements one of the other. The Manchester Ship Canal is said to have solved the great transportation problem of that city, and throughout England there has been for some time a movement for the resuscitation of inland waterways. Vast sums of money have been spent upon these European waterways, with success apparently sufficient to warrant the present increasing appropriations in nearly every country on the Continent. Nearer home, Canada is bestirring herself, and planning a great ship canal to the Lakes. If waterways are successful abroad, it is reasoned that they should prove likewise successful in America. Note again that at this point I am merely giving the popular reasoning on the subject.

III. MERITS OF THE WATERWAY PROPAGANDA

Turning now from this brief survey of the nature and causes of the waterway movement, let us turn to an analysis of the merits of this waterway propaganda. We shall find it surprisingly easy to show that the movement has been largely ill-considered and ill-advised, and that, in the main, it is economically unsound. The question of the relative cost of water and rail transportation is obviously the paramount consideration.

The popular argument that water transportation costs only a fraction of that by rail runs somewhat as follows: The average charge made by all the railways of the country for the calendar year 1907, for example, was 7.82 mills per ton-mile. On the Great Lakes the charge was .8 mills per mile and on the Erie Canal about 3 mills per ton-mile. A dollar then will carry a ton of freight the following distances: by rail, 127 miles; on the old Erie Canal, 333 miles; on the Great Lakes 1250 miles; and on the enlarged Erie Canal nearly 2000 miles.

In considering these statistics of comparative costs it is necessary to inquire if the term *cost* has the same meaning in the various cases compared. The *costs* given above, it will be noted, are synonymous with rates charged. Now, what is included in the making of rates in the various cases, and are *rates* and *costs* fairly synonymous terms?

The average freight rate which we have been considering was levied so as to secure to the railways a profit upon the entire capital investment of the railways of the country.

The cost of building the roads, cost of equipment, of maintenance, and of operation, that is, the actual hauling expenses, all were considered in the adjustment of the rates on the railway. Let us now pass to a consideration of what is included in the term *cost* as used in connection with the waterways.

COST OF WATER TRANSPORTATION

It is said that a dollar will move a ton of traffic on the Great Lakes a distance of 1250 miles, as against 127 miles on the railways. But since the Great Lakes constitute a highway made by nature, the rates charged there need be merely sufficient to yield a reasonable profit on the investment in the ships, in addition to meeting the expenses of operation. Naturally the rates under such conditions would be much lower than if they had to earn a profit on a tremendous investment in the highway itself. A comparison of railway rates with the charges on canals, which, like the railways, are artificial highways, evidently affords a fairer basis from which to draw conclusions.

It is contended that one dollar will move a ton of traffic on the railways only a distance of 127 miles, as against 333 miles on the present Erie Canal; and that with the opening of the new barge canal this distance will be extended to about 2000 miles. What is meant by cost as applied to the Erie Canal? It was built by the state of New York and is now donated to private use. Anyone who desires can build a boat and engage in the carrying trade free of charge on the state's highway. If he can earn in addition to the operating expenses a reasonable profit on the cost of a small boat or barge he is satisfied. Thus, whereas the railway rate is fixed to cover a profit upon the total cost of the highway's equipment, upkeep, and operation, upon the railways, the rate on the Erie Canal has to cover no part of the enormous expenditures involved in the construction and maintenance of the waterway itself. Thus the cost item which is by all odds of chief importance is omitted from computation. The cost of building and maintaining a canal, as in the case of a railway, is always the chief outlay connected with the transporting of goods. Indeed, it is the tremendous amount of fixed capital involved that particularly distinguishes the transportation business. Consequently, in comparing the relative cost of two rival modes of transit, to omit the enormous construction and maintenance expenditures in the one case, and to include them in the other is totally to invalidate the conclusions drawn. Yet this is the method that is commonly employed in proving water transportation less costly than transportation by rail."

THE NEW YORK BARGE CANAL

The latest figures indicate that the total cost of enlarging the Erie Canal will not be $101,000,000.00, as originally estimated, but approximately $135,000,000.00. This is an average of $330,000.00 per mile. This is to be compared with an average railway capitalization of less than $60,000.00 per mile, for the country as a whole, and with a present day cost in the eastern states of probably not more than $100,000.00 per mile. At least three fully equipped double-track railways could be constructed between Buffalo and the Hudson for the cost of the new Erie Canal.

It is argued, however, that since the state will charge no tolls on the canal that this enormous capital cost need not be borne by the shippers. True; but it must be borne by someone. If the state builds and keeps in repair a canal, which is donated to the use of shippers free of charge, interest on the bonded indebtedness and the annual maintenance charges are not thereby eliminated. They are merely shifted to the taxpayers and remain quite as much *costs* of transportation as when paid by shippers in toto, as in the case of rail transportation. In fact, the people of New York are going to find their taxes increased in consequence of the expenditures on the Erie Canal by over $7,000,000.00 annually.

To get an accurate comparison suppose New York State, instead of enlarging the Erie Canal were to construct a double track railway for freight purposes only, and were to donate this to a company free of interest charges, and with all costs of maintenance and upkeep defrayed out of the public treasury. Suppose a railway company having therefore to cover merely direct handling and haulage expenses, including a fair return on the cost of rolling stock, and you have the parallel of present day canal operation. With such aid is it not probable that the railways could quote rates less than 7.82 mills per ton mile? The fact is, that thus considered, with all items of cost included on both sides of the equation, water transportation costs substantially more than rail transportation.

When driven to face this question of indirect cost, however, the waterway advocate usually replies that while it may be true that the original cost of building canals is greater than that of railways, this is much more than counterbalanced by the vastly greater carrying capacity of canals. Let us briefly test this argument.

The method employed in showing the greater carrying capacity of a canal is to proceed upon the assumption that the canal is to be utilized to its maximum capacity, whereas the data for the railways are based upon actual tonnage statistics. But since a railway is seldom used to anything like its full theoretical capacity, the comparisons that are thus made are wholly inconclusive.

(Concluded in December)

THE WEATHER FACTOR IN THE GREAT WAR: V
SPRING AND SUMMER, 1916[*]

By Robert DeC. Ward
Harvard University, Cambridge, Mass.

The Western War Zone[**]

THE German attack upon the Verdun salient, begun at a season meteorologically unfavorable, was probably undertaken then in order to forestall the long expected "spring drive" of the Allies, and to force an enormous expenditure of French ammunition. Snowstorms and miry, treacherous ground were serious obstacles in the way of the most effective offensive movements. In spite of all such handicaps, the German attacks were continued with remarkable persistence and severity, there being only slightly reduced activity when spells of bad weather hindered artillery firing. The importance of having a wind of the right direction and velocity when asphyxiating gas is used was strikingly shown on two occasions. A French gas attack (Berlin report, May 18) failed to be serious because "a squally wind" sprang up and diffused the gas. And during a German gas attack in the Champagne district (Paris report, May 22) an unexpected change in wind drove the deadly fumes back into the German trenches. The situation along the remainder of the western front may best be summarized in the words of a British officer: "Mud was the reason why we could not attack and thus relieve the pressure on Verdun. It was the season the Germans would have chosen for us to attack." In Gen. Haig's official report, covering the winter and spring months, reference is made to the necessity of constant and heavy work in maintaining and repairing the trenches, destroyed by bad weather and by the enemy's bombardment. The relief from the cold and wet of the winter trench-fighting was very welcome. One report (Apr. 26) mentions an attack, after two days of spring rain, when the men "sank up to their arm-pits in the morass, and half-crawled, half-swam, under shell fire."

It may have been accidental, but it probably was carefully planned, that, after what was reported to have been an unusually wet and disagreeable June, the great Allied drive began most auspiciously (July 1) on a fine, warm, clear day, with brilliant sunshine. This was a great advantage to the British and French artillery observers, who were able to see long distances and could direct their fire most effectively. The good weather, it is noted, helped greatly in the recovery of the wounded. But there were many weather conditions during the remainder of the summer which were far less favorable. "Mists", which were obviously the early morning fogs so common after clear, calm nights, several times made it difficult for the infantry units to keep in touch with one another, and for the gunners to follow their advance, until the sun later "burned off" the fog. Heavy thunderstorms became more frequent as summer advanced, and these, together with heavy general (cyclonic) rains lasting many hours, often "compelled a lull." In some cases the fighting continued, but it was usually limited to artillery duels and bombing operations. During dry spells the dust raised by the bursting shells was greatly increased by the dust caused by marching troops and by traffic. It became impossible to determine the exact position of friend or foe. Haze, resulting in "low visibility", and low clouds, made artillery observations difficult. In one case the Germans profited by a thick haze to bring up fresh troops and guns. At the end of July mention is made of "sweltering heat", and of the "first real hot wave of the season". Clear, hot summer weather was reported "everywhere in Germany", and was welcomed as bringing very favorable crop conditions after many days of clouds and rain. The use of carrier pigeons was not attempted in "bad weather". Only once (June 27) was mention made of a change of wind during the employment of poisonous gas. On that day (Berlin report) the gases "in some cases floated back to the enemy trenches".

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[*] Previous papers in this series are as follows: *Popular Science Monthly*, Vol. 85, Dec., 1914, 602-613; this *Journal*, Vol. 13, Feb., Mar., 1915, 169-171, 209-216; Vol. 14, Nov., 1915, 71-76; June, 1916, 373-384.

[**] The present article does not refer to minor and constantly repeated influences of weather conditions upon military operations, enumerated in the earlier papers of this series. Attention is here paid chiefly to the larger controls, and to new facts.

EASTERN EUROPEAN WAR ZONE

The spring thaws, with the resulting floods, the necessary abandonment of low-lying positions, and the almost insuperable difficulties of transportation, were doubtless important factors in preventing a Russian spring drive. The Germans, generally established on higher ground, and with far more ample and sufficient railway communications, were not as severely handicapped. It is reported that Field Marshal von Hindenburg foresaw this, and halted his autumn drive into Russia before it was necessary, in the hope that spring conditions would automatically compel a retirement of the Russian lines. It is not improbable that the Germans, trusting in the expected effects of the late Russian spring thaws in holding the eastern battle lines essentially unchanged, were the more ready to mass their troops for the Verdun attack. Yet these same thaws forced a certain amount of fighting on the eastern front, for when the trenches were flooded along the Dvina River, and in the swamps around Dvinsk, both sides made a desperate struggle to hold, or to gain, the highest ground. Water had to be pumped out of the trenches; some attacks were actually made in boats; and the men were often in water up to their breasts.

On March 15 it was reported that about 100 vessels carrying war supplies were frozen in at or near Archangel. On April 1 a Copenhagen despatch noted that the ice in the White Sea was beginning to melt, and that maritime traffic would probably be resumed at Archangel by April 15.

The spring drive of the Russians on the eastern front was doubtless delayed beyond the expected time in order that better weather would prevail, although the lack of ammunition was probably an additional reason for the delay. Very cold weather was reported in Russia early in June. Snow fell in Kazan. Temperatures below freezing were recorded in Nizhnii-Novgorod. Crops, well advanced owing to an early spring, were frost-bitten in southern Russia. During late July and in August operations in Galicia were impeded by floods. Bridges were washed away. Owing to the lull in the fighting the Austro-Germans were enabled to send some of their troops as reenforcements to other fronts.

The Austro-Italian War Zone

There is nothing new to report from this battle front. The struggle between man and man has been accompanied by a continuous struggle between man and nature. Storms, deep snows, avalanches, heavy rains and fogs have added greatly to the difficulties.

The Russo-Turkish War Zone

Floods caused by melting snows in the Pontine Mts., back of the sea-coast, washed away the bridges on the coast road, made it difficult or impossible for the Turks to bring supplies and reinforcements to Trebizond, and hastened the fall of that city (April 18). The capture of this important place, and other events in the nearer East, showed clearly that Russian activities were not seriously hampered by the difficult terrain nor by the heavy winter snows and cold weather on the mountains and plateaus of that rugged region. In May, the spring melting of the deep snow favored the descent of the Russian armies from the higher elevations into the valleys and lowlands, and was followed by an increasingly active campaign.

An American agent who visited the German prison camps in Russian Turkestan emphasized the importance of having a knowledge of the climate before forming any judgment of the conditions and treatment of the prisoners of war there. The extreme dryness, the long, hot summers with temperatures of 120°F. and over, and the short, cold winters, with temperatures below zero, bring sharp extremes. The winter cold results in closing the windows, and when the prisoners are confined in close quarters this lack of fresh air becomes a very serious problem. In mid-July the Russian Cossacks in crossing the Armenian mountains reached the snow line.

The British Mesopotamian Campaign

In regard to the British surrender at Kut-el-Amara Lord Kitchener said that adverse elements alone were responsible for the lack of success. Constant rain and the consequent floods had not only impeded the advance of the Relief Expedition but had compelled, in place of a turning movement, a direct attack upon an impossibly narrow front. The House of Lords would not fail to realize, the War Minister said, how tense was the strain upon these troops, which for more than twenty weeks had held their positions under conditions of abnormal climatic difficulty and on rations, calculated for protraction to the furthest period until, as it proved, imminent starvation compelled their capitulation. During a heavy thunderstorm in March (Berlin report) the principal British camp was struck by lightning, and "extensive damage was done". On April 12 Gen. Lake reported that water from the marshes was driven by a northwest gale into some of the enemy's trenches, driving the Turks out to a new position. Many engagements were fought with the men up to their hips in water. With the advance of spring, the heat became intense. On May 20, Gen. Lake reported "the weather is intensely hot and trying", with temperatures over 100° in the shade.

The heat was so intense (over 120°F.) in July that both British and Russian troops had to remain inactive for many days. The Russians retreated almost 80 miles in the Bagdad region. The principal reason for this retreat was the intense heat, which made campaigning very difficult. It was reported that the Russians planned to remain in the cooler hill country until the temperature conditions made the resumption of the advance expedient. On July 16 Sir Victor Horsley, the eminent surgeon, died of heat stroke.

THE WAR IN AFRICA

In the campaign against German East Africa Gen. Smuts reported (early in March) that heavy rains and swollen streams hindered pursuit on the part of the British. Bridges were washed out, and had to be repaired. Under date May 1 Gen. Smuts reported "the rainy season has set in with great violence". In Egypt, the advance of the hot season made the chance of any serious attack from the east, across the desert, very unlikely, if not altogether impossible.

After the German drive through the Balkans, early in the winter, and the opening of communication between Berlin, Vienna and Constantinople, a Turko-German attack on the Suez Canal was expected in the favorable months of January, February and March, "when white men may manoeuvre in the desert". This attack did not materialize, probably because the troops necessary for this undertaking were needed elsewhere. A Turkish attempt to reach the Canal early in August failed completely. The troops advanced in the face of the greatest difficulties; their guns were dragged across the desert on planks, which were used to prevent the wheels from sinking into the sand. The routed Turks suffered terrible hardships in their retreat. In some cases the men suffered so much from thirst that they killed their camels and drank the blood. The Turkish despatches mentioned a "gigantic sandstorm", which impeded their left wing. Taking advantage of this condition, the British made a successful surprise attack.

THE WAR IN THE AIR

An air raid on England took place early in March, during a snowstorm, and with "more than a little wind" from northeast. Before this several Zeppelins had been brought down owing to the weight of snow upon them, but on this occasion no such result was reported. During another raid, on April 1, under very favorable weather conditions, a Zeppelin was brought down and the crew was captured. The men reported that the night was so cold that their air-ship was covered with frost, and they suffered severely. On April 25, on a dark, clear night, three Zeppelins visited the eastern counties of England when the wind was southwest. Up to that time, the raids had been made during light easterly winds. On this particular occasion, however, the wind, although from the wrong direction, was very gentle, and "any threat of a storm was lessened by a favorable barometer". It appears, more and more emphatically, that the Germans have made a very careful study of weather conditions before starting their Zeppelin raids, and it also seems as if, with their new super-Zeppelins, they are becoming somewhat more independent of wind and weather. Early in May, however, Zeppelin L-20 was blown eastward by a strong wind and was wrecked on the coast of Norway. On May 6 a number of French captive balloons broke loose during a sudden storm and were driven into the German lines. One of the sensational exploits of the war was the feat of Sub-Lieut. Guynemer, of the French Army. On one of his flights he chased a German to a height of two miles, where the cold was so great that the oil in his machine gun congealed. Nothing daunted, Guynemer dashed against the German machine; both fell; the German was crushed at the end of the fall, but the Frenchman came down safely.

A distinguished European aviator has recently said that favorable weather conditions are no longer necessary when flights are undertaken, but that the men go up "when they have to", without regard to the weather. While this is to a certain extent true, it must not be taken too literally. Thus, on the western front, we note that rain and thunderstorms and low clouds and bad weather frequently interfered with air work. Low clouds and fog "mists" make low flying necessary, and expose the aviators to the danger of gun and rifle fire. In his criticism of the British Air Defense against Zeppelin attacks, Lord Montagu rightly said: "Our greatest ally has been the weather". Some interesting details regarding the work of the British aviators in Egypt were contained in a despatch from British General Headquarters in Egypt (July 8) to the London *Chronicle.* "All the difficulties of flying under tropical conditions with an equipment not designed to meet such special circumstances" were met with. The intense heat caused gasoline tins to burst. Evaporation was so great that a consignment of 7 cases supposed to hold 56 gallons contained only 37 gallons. Thorny plants punctured the tires of the motor trucks. With the thermometer "registering 120° in the shade" work was hard. Most of the transport was done with camels. Flying after mid-day was dangerous because of "heavy storms" (doubtless daytime winds, carrying sand).

THE WAR AT SEA

In the autumn of 1915, British submarines carried on an active campaign against the shipping (chiefly ore boats) between Scandinavian and German ports. During the winter, these undersea boats seem to have been laid up in Russian Baltic ports. With the breaking up of the ice in the spring, the campaign began again.

Bad weather in March caused many of the Entente Allies' mines to get adrift, making entrance to the Channel easier. The result, according to official French reports, was a greatly increased activity of German submarines in that region.

There is no doubt that meteorological conditions played an important part in the Jutland sea fight of May 31. Admiral Sir John Jellicoe, in his official report, said: "Weather conditions that were highly unfavorable robbed the fleet of the complete victory expected by all ranks". These unfavorable conditions resulted from a thin drizzle or mist, which reduced the visibility and obscured the German ships, greatly handicapping the British gunners. The British ships, on the other hand, were silhouetted sharply against a clear western horizon. What the results would have been if the German war vessels had been as easily distinguishable as the British, will never be known.

A GERMAN VIEW OF THE WEATHER AND THE WAR

In these articles all the facts cited have been taken from the reports (mostly official) published in American papers and magazines. It is interesting to see what a German writer has to say on the same subject. The first German publication in which the weather influences in the present war are mentioned, so far as the writer is aware, is a little book, "Vom Wetter", by Dr. Hennig, 1915.

The winter of 1914-15 was, with the exception of a few cold spells, exceptionally mild. The December, January and February means were higher than normal. In eastern sections, November was a little too cold, and the March means were also generally below normal. Minimum temperatures in eastern Europe were several degrees (15°-20° or more) higher than usual. The cold spells in the east were scattered through the winter, e. g., in early and late January, early February, and in the first half of March. In the Carpathians, Serbia and the Caucasus cold and snow caused great suffering. Dr. Hennig says that a colder winter over the rest of the battle-grounds would have been a help to the Germans. In November, 1914, Field Marshal von Hindenburg hoped for a long period of severe cold which would prevent the Russians from throwing up fortifications. The Russians, on the other hand, also longed for a severe winter, hoping (in the words of Dr. Hennig) "that, as in 1812, 'Gen. Winter' would win their battles for them which they could not win themselves." The Germans would have had a far easier campaign if the flooded areas in Flanders and the marshes in Russia could have been crossed on the ice. In Flanders and northern France, however, such a thickness of ice comes only rarely. August, 1914, brought great heat. The maxima Aug. 9-10, at Mulhausen, were over 85° Fahr. And during the first battle at Lemberg, at the end of August, the heat was also so great that rains on Sept. 1 were very welcome. The summer of 1915 was very favorable, with excessive heat on a few days only. Seasonable temperatures, almost without exception, prevailed during the German summer "drive" against Russia. The spring and early summer (1915) were unusually dry. Thunderstorms seem to have been comparatively few in number, probably, according to our author, because the temperatures were not generally very high. Zeppelin L 10 was struck by lightning Sept. 5, 1915, while over the sea near Cuxhaven.

The Entente Allies' movements (Sept. 1914) in the long battle of the Aisne were much hindered by bad weather and high water in the rivers. This gave the Germans time to build trenches and fortifications, which long proved useful. Certain French failures near Soissons were ascribed by them to bad weather in order to conceal their own incompetence, in Dr. Hennig's opinion, for the rains and floods in no way interfered with the German operations. On Aug. 28, 1914, a fog favored an advance of British war vessels against Heligoland. Three small German cruisers were lost by reason of their steaming into the midst of the enemy ships during the fog. When the fog cleared, the German vessels were speedily attacked and sunk.

(Dated Sept. 28, 1916).

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The Earth Science Section meeting of the Central Association of Science and Mathematics Teachers to be held in Rosenwald Hall Lecture Room, University of Chicago, Friday afternoon and Saturday morning, December 1 and 2, promises to be of unusual interest to geographers. F. W. DeWolf, Director of Illinois Geological Survey, speaks Friday afternoon on "Geological Science as Adapted to the Development of Mineral Resources, with Special Reference to Illinois." Several discussions on the topic, "Some Experiences in Schools where the Junior-Senior High Schools are in Operation," follow Mr. DeWolf's address. Prof. Chas. R. Dryer is the principal speaker Saturday morning. Robert G. Buzzard, formerly of the Harvard School for Boys in Chicago, discusses "Geography and Boys." Several short speeches by Normal School teachers of geography on professional aspects of the subject follow. It will be a meeting well worth our while as students and teachers of geography.—[*Bull. Ill. Council of Geog. Teachers.*]

HIGH SCHOOL COMMERCIAL GEOGRAPHY*

By SUMNER W. CUSHING
State Normal School, Salem, Mass.

ORGANIZATION

THERE are three schemes of organization in common use in schools and textbooks. First, there is the *regional* treatment that uses the country or state as the primary unit of thought; second, the *commodity* treatment, wherein important commodities of commerce play the leading part; and third, the *economic* treatment in which the most important role is assumed by the four great fields of commerce and industry—(1) primary production, (2) transportation, (3) manufacturing, and (4) consumption.

The strength of the regional treatment lies chiefly in its practicality. The general reader meets continual references to countries or states. He finds it useful to have his knowledge indexed by political units. The most serious objection to the regional treatment is that it almost inevitably seems monotonous to students because their course in elementary geography has already been based on regions. The commodity treatment is probably the weakest of the three if it is consistently followed throughout the course. The study of a few representative commodities, specially selected for definite reasons, can well be approved, but beyond these the work has an irksome sameness and is aimless since no important new principles are presented, and the problems to be solved are all of the same kind.

The economic basis for a course in commercial geography is strong in the newness of approach from the students' point of view, in the life it may receive from local studies, and in the usefulness of the body of knowledge it builds up, and the power it develops. Nearly every community in which commercial geography is taught presents problems in each of the fields of commerce and industry. There may be local farming, forestry, fishing, or quarrying to illustrate the forces at work in the field of primary production. There is almost sure to be a great variety of means of transportation, each showing the local solution of a universal problem. Manufacturing plants offer ample first-hand material for illuminating the varied forces at work influencing the character and distribution of industries. The community itself inevitably exhibits the relation that the consuming center has to each of the other fields of the subject. If this economic outline be strongly reinforced with a secondary regional treatment, that is, if the local study of transportation, for example, be followed by the study of transportation in the United States, and then by comparison with other countries, an ideal organization would seem to be attained.

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* Prepared for a *Bulletin on Commercial Education* to be issued by the Massachusetts Board of Education.

The usefulness of the knowledge and power produced by a course built upon the economic basis is apparent when it is recalled that the problems that confront the man of practical affairs center around the raw materials or primary products, transportation, manufacturing, and the marketing of the finished products. The lack of textbooks built upon this plan is its only serious drawback.

If a course in commercial geography based upon the four economic fields is given in the junior high school it would seem best to give the subject a regional basis in the commercial department of the senior high school.

ORDER OF TREATMENT

The logical order of the adult is rarely the order to be followed by the student. His interest is the controlling factor in determining the order of treatment. Since the course is founded upon local studies in the four fields, the best time for studying the local phase will determine the best time for considering the broad field in general. Obviously the best season for studying primary production locally is not in winter; it may be in the fall. In general the spring would seem to be the season when interest in primary production is highest, especially if farming be the most prominent local phase of primary production. Visits to manufacturing plants can be made as readily in winter as at any season. Studies in the consumption field can similarly be carried on equally well at all seasons. Transportation problems are probably the easiest of the series and the factors are most readily observed. Hence this field may well be treated first. It would seem, therefore, that a course in commercial geography should consider the fields in the following order: (1) transportation, (2) manufacturing, (3) consumption, and (4) primary production. The interest of the students and local conditions, however, must decide the details of organization.

DISTRIBUTION OF EMPHASIS

Emphasis in a course of study may be indicated crudely by giving the time allotted to the various subjects of the course. Since Massachusetts is so largely a manufacturing state dependent upon raw materials and food brought from a distance, and upon products carried to distant points for sale, manufacturing and transportation should be the fields having the greatest amount of attention. Perhaps two-thirds of the total time should be devoted to them, while the other third should be equally divided between primary production and consumption. In a farming section, however, greater emphasis should be put upon primary production than upon any other field. In a word, the probable occupations to be followed by members of the class will be the chief factor in determining the distribution of emphasis among the fields of the subject.

Fully as important as the distribution of emphasis among the four fields of commercial geography is the distribution of emphasis among the countries. Surely the United States, as the broad field of endeavor of the students, deserves the largest share of time. Perhaps two-thirds is not too great a share. This two-thirds includes of course the home geography of commerce and industry. In the average manufacturing city of Massachusetts a teacher skilled in pointing out important local problems may well spend thirty or forty periods in this home work. During the course, however, constant reference should be made to the whole United States. There should be continual comparisons between the degree to which a given activity prevails in one part of the country and in another. In such comparisons emphasis should not be placed upon the political division but on the geographical regions. Statistics should be used freely, but they should largely take the form of comparisons of the production, consumption, etc., per *individual*, and not for the total of a given territory or area which may have many or few people. In discussing the United States similar comparisons should continually be made with foreign countries. This is particularly important in order to avoid the dangerous tendency of Americans to underestimate the other parts of the world.

Next to the United States the largest share of time should be given to Great Britain, Germany, and France, and to the group of minor countries which share their industrial supremacy. This is advisable not only because these countries have important trade and political relations with the United States but also because they are able to teach our country many important lessons in commerce and industry. A number of other countries should be briefly studied for special reasons; Japan, for its rapid advance in manufacturing and commerce and as the only Asiatic country which in any way rivals the United States; Italy, for its immigrants to America, and as a growing factor in European markets; Russia, as the nearest counterpart of the United States in the Old World in its physical conformation; China, as a region of primary production of silk and tea, and as a future market for many American products; Brazil, because of the coffee and rubber; Chile, as a producer of nitrate of soda; Argentina, as a market for our manufactured goods and as a competitor of the United States in the European market in selling grains and meats; and the tropical regions as the world's greatest undeveloped areas and future producers of wealth.

Still other countries may be brought into the course to illustrate the working of certain principles: Norway, for instance, to show how a rugged region and irregular coastline force the inhabitants to become sailors or fishermen; Central Africa, to bring out the relation between an undeveloped region and primitive means of transportation; Mexico, to make clear the need of a stable government as a basis for progress in any occupation or industry; and Egypt, to show what irrigation can accomplish in the desert. This kind of work is well adapted for special treatment by selected students who will report to the class.

Time will not permit an exhaustive treatment of the four fields of commercial and industrial geography. Therefore, the subjects to be treated must be selected with care. In the field of primary production, for instance, only those products should be treated that are of special importance; (1) to the United States, because we produce vast quantities, such as cotton, corn, copper, coal, iron, and wheat, or because we consume vast quantities of goods produced elsewhere, such as coffee, silk, and rubber; (2) to the local community because they are produced extensively, such as tobacco in the Connecticut Valley, or because they are used as raw materials by the local factories, such as hides in a tanning town.

PRACTICAL SUGGESTIONS TO THE TEACHER OF COMMERCIAL GEOGRAPHY

1. In all recitation work that has to do with places, have the students make constant use of the wall map.

2. Use outline maps for locating important products, commercial centers, and trade routes.

3. As a rule "Why" questions are far more valuable than "What" questions. "Why" questions develop power in reasoning; "What" questions develop mere memory.

4. A knowledge of the location of places cannot be attained merely as incidental to the study of important relations. There should be frequent, rapid reviews in the location of places.

5. Let the pupils gather interesting newspaper clippings

and pictures from newspapers and magazines, and let them report to the class their own interpretation of these.

6. Remember that, at best, text-books of commercial geography merely direct the main lines of work. The local surroundings furnish the living problems, and maps, atlases, encyclopedias, government reports, magazines, etc., are all good reference sources.

7. The students' interest is of fundamental importance. If it is wanting, adjust your work to secure it.

8. A good museum showing commercial commodities and their various stages of manufacture, is of great aid in making the work concrete, and in securing interest. Many companies are glad to donate exhibits.

9. Take excursions, if possible, to farms, mines, wharves, freight houses and yards, and factories, and be sure they are carefully planned to lead the students to see the "What's" and "Why's" of commerce and industry.

10. Do not teach too many topics. Remember the aim of the course is to develop power in the student, rather than to cover a certain amount of ground in the book.

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THE TUNNELS OF THE ALPS

By Hazel M. Ketcham

Grand Rapids, Mich.

IN this age of iron and electricity great progress is being made in all lines and this advancement is especially marked in constructional engineering. In every continent we find man conquering the grandest of Nature's efforts by means of canals, dams, or tunnels.

In a former age the Alps were much dreaded and travelers avoided the dangerous gorges and difficult roads. Now they are crossed by eight railway lines and all of them have tunnels, some of which are from 9 to 12 miles in length. The most important of these are the Mont Cenis, St. Gothard, Arlberg, Simplon, and Lœtschberg.

The art of tunneling dates back to remote ages and there are records of such works being constructed 500 to 600 years before the Christian Era; but all of the large tunnels have been built within the last hundred years.

The Mont Cenis tunnel was the first large tunnel to be built in the Alps and when it was started the use of machine drills was not known; such drills were not introduced until four years later and up to that time all the work was done by hand at an average progress of 9 inches per day.

The St. Gothard tunnel was constructed next and although it is not so long as the Simplon tunnel, the death rate was much higher. Most of these deaths were due to insufficient ventilation and the high temperature of the tunnel; as a result the workmen were much better cared for in tunnels built later. In addition to the main tunnel, 9¾ miles long, the St. Gothard Railroad has six shorter spiral tunnels in which the railway makes complete loops and double loops within the solid rock of the mountains.

Since Roman times the Simplon pass has been the avenue of trade between Milan and the Rhone valley. In 1806 the Simplon Pass Road was built by Napoleon and the Simplon tunnel, the longest railway tunnel in the world, was practically completed 100 years later. It begins near Brieg, Switzerland, and ends near Iselle, Italy, and saves three and one-half hours in time of transit between Paris and Milan.

The tunnel consists of twin single track tunnels at a distance apart from center to center of 55 feet, and exactly parallel in plan and profile. One of these tunnels was completed in 1905, but the other was made only a working gallery at first. Work was begun on the second tunnel in 1912, and it was half completed at the end of October 1915. The work was very much interfered with by continual change in workmen due to the drafting of Italian laborers for the army. The tunnels are connected every 220 yards by transverse tunnels to aid in the circulation of air.

As soon as work was begun on these tunnels permanent ventilation plants were installed at each end, and in the second tunnel a new process was used to overcome the intense heat. Cold water brought from the outside was run through pipes pierced with little holes and was thus made to fall in a fine rain. Through this liquid curtain fresh air was forced, reaching the laborers so cooled as to be endurable. Water power was employed for practically all purposes in the first tunnel and compressed air in the second.

All of the Alps tunnels, up to the time of the building of the second Simplon tunnel, were lined with natural stone. This tunnel was lined with natural stone where there was a great deal of moisture or the pressure was very heavy; in all other places it was lined with an artificial stone made in the shape of bricks.

The Loetschberg tunnel was built in the northern Alps and is the largest tunnel in the world in that it contains two tracks.

Everything in the building of this tunnel was done by electricity from practically one source, that was the Kander torrent. This torrent flows from the heart of one of the highest glaciers and though but a creek in volume, the water flows down the steep slopes at such speed that it generated most of the electricity used.

The entire Loetschberg line was put into operation in 1913 and is operated entirely by electricity. Electrification of the Mont Cenis railroad is under way and there is no doubt that before long all the trains crossing the Alps will be run by electricity obtained from mountain streams.

	Length	Date of beginning	Time in building
Mont Cenis	7½ miles	1857	13 yrs. 1 mo.
St. Gothard	9¾ miles	1872	7 yrs. 4 mo.
Arlberg	6¼ miles	1880	3 yrs. 4 mo.
Simplon 1st	12¼ miles	1898	6 yrs. 6 mo.
Simplon 2nd	12¼ miles	1912	
Loetschberg	9 miles	1906	4 yrs.

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THE NILE DAM AT ASSUAN

By Nelle G. Hudson

Boscobel, Wis.

SOMEWHERE in the dim vista of the past a branch of the Hamitic family found its way into the northeastern part of the Dark Continent. Here existed a region lacking rainfall and yet luxuriant vegetation abounded along the flood plain of the great river. The benevolence of the stream seemed never to cease as it wended its way northward to join the sea.

Their agriculture was of the crudest kind but still it supplied their wants. No one knows the exact date of the beginning of irrigation in Egypt but we may at least say 5,000 years. Still the fertility of the soil is unabated. The annual overflow of the river has supplied the abundant plant foods which have given to this soil the name of "everlasting."

Until recently the Egyptians used the system known as *basin irrigation*. In this system many basins varying in size from 5 to 50,000 acres, were shut off by means of water tight embankments. During flood they were filled to a depth of four feet or more, and were allowed to stand for six weeks. Then the water was drawn off and the seeds planted in the mud.

Such a system is wasteful of water. Mohammed Ali, a reigning viceroy, saw this and at the same time realized that under such a system Egypt was not at her best. He determined to change it all, and he did. From this time (1820) dates the renaissance of agriculture in the Nile Valley. It made possible the culture of cotton and of harvesting more than one yearly crop of selected agricultural products. At the present time, out of the 6,250,000 acres of land cultivated in Egypt, less than 2,000,000 have the basin irrigation.

After the English secured control of Egypt they set about to improve and increase its agricultural output. They found the chief drawback to be lack of moisture. Their irrigation was wasteful of water, and their methods of tillage were antiquated. The water supply was most important and they looked to that first.

Perennial irrigation for the region would require 30,000 cubic feet per second; the Nile furnished a constant supply of 8,000 cubic feet. Hence some means must be found of supplying this deficiency. It was found that in times of flood the river supplied from 300,000 to 500,000 cubic feet per second, and the engineers determined that the necessary procedure was to store some of this water by constructing a system of dams and regulators.

Assuan at the First Cataract was selected as the most favorable site for a great dam. Here the river flows over a bed of granite which gives a suitable foundation for the masonry. When excavations were made the surface rock was found to be disintegrated to a depth of 45 feet, and an immense amount of material, 824,000 cubic yards, had to be removed. The dam would have to be so constructed as to discharge the whole flow during the early flood period on account of the great amount of sediment present in the water. If the silt-laden flood waters were stored, the accumulation of mud would soon fill the reservoir. The river is free from silt by December, therefore the reservoir would have to be filled during December, January, and February, and drawn down during May, June, and July.

The construction of this reservoir was awarded to a firm of English contractors who adopted Sir William Willcocks's plan with some modification. According to the first plan the dam was to be 100 feet above its base and was to hold 85 billion cubic feet of water. If so constructed the Island of Philae would be covered to a depth of 40 feet. This caused trouble at once, and a worldwide protest arose, for this island has the best preserved temples of ancient Egypt. It was compromised by building the dam 26 feet lower than original plan, and to hold 35 billion cubic feet of water. It was completed in 1902.

In order to give an idea of the size of this reservoir I give the following figures:

Total length of dam including lock	6400 feet
Solid masonry	1800 feet
Masonry containing sluices	4600 feet
Greatest height above foundation	96 feet
Maximum depth of water at dam	65.6 feet
Width of top of dam	16.4 feet
Number of sluice ways	180
Amount of masonry	700,000 cu. yds.
Number of men employed	12,000

When full at the present time it holds 37 billion cubic feet of water and backs up the water for nearly 200 miles.

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THE FILING AND PRESENTATION OF ILLUSTRATED GEOGRAPHICAL MATERIAL

By Sayrs A. Garlick
Chicago

THINKING that the following suggestions would prove of value to those enthusiastic teachers of Geography who present that science as a live and vital study to the child, I take this opportunity of circulating a successful method of presenting pictures to the children.

As by far the vast majority of my pictorial material is taken from *The National Geographic Magazine* all dimensions are given with the view of accommodating a page of that size. Obviously the dimensions may be altered to meet the individual's need.

I find it of value to keep the articles appearing in the magazines intact, and my method of filing and presentation is adapted to that end. For filing purposes the Bushnell "Paperoid" expanding wallet 9″x12″ with 1¾″ expansion is used. However its manufacturers, The Alvah Bushnell Co., of Philadelphia, Pa., supply the wallet in various sizes. The pages of the magazine are removed from the binding by bending back the clips, after which they are cut apart with a paper knife. To preserve the entire article and to keep the pages in their correct sequence they are held together with a large-size paper clip. The articles are then filed according to the country or type of subject matter of which they treat. On the outside, in the upper corner of the filing wallet, the name of a country or special topic is printed, and as this wallet contains only such subject matter as is indicated, it is a simple matter to locate any desired pictures. In some cases it will be found that the last page of one articlé and the first page of another are on the same sheet. In this case the sheet is kept with the first, and the title of the following one is copied on the second page of the subject matter to which the title is relevent, and a notation is made to indicate in what wallet, and in connection with which article the missing page may be found.

In case only certain pages or pictures are desired, the clips can be removed and the page or picture laid aside. To assure the return of the page to its proper place it is advisable to write a number on the first remaining page and duplicate that number

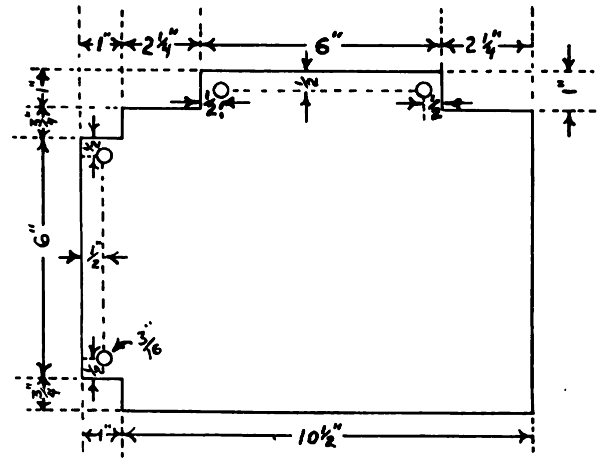

Fig. 1

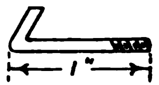

Fig. 2

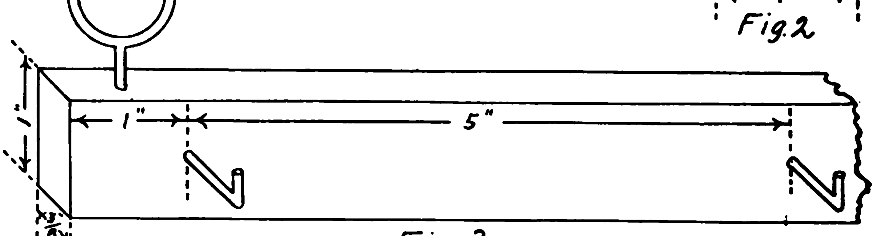

Fig. 3

on each leaf removed. This insures facility in returning the pages to their proper place, in case pages from various articles have been removed for use during the same lesson.

Often there are useful picutres on two sides of the same sheet. If the picture is pasted on a mount-board, obviously one picture is lost. The writer is indebted to *The Journal of Geography* for the suggestion that pictures be attached to mount-boards by clips affixed to the four corners. This obviates handling a heavy and bulky accumulation of useless card-board.

Fig. 1 is a sketch of the card-board to which the pictures are to be attached. Its construction and advantages are self evident in the diagram.

After the pictures are attached to the card-board they are hung before the class on 1″ hooks (Fig. 2). These hooks are bent back on themselves to prevent any breeze from blowing down the card-board. As shown in Fig. 3 the hooks, 5″ apart, are screwed into a hard-wood strip (soft wood sags excessively) to accommodate the holes in the card-board.

The strips are hung by means of hooks and screw eyes, one set at either end and one midway between, if necessary. Too often teachers hang their pictures at a considerable height above the level of the child's eyes. The height at which these strips are to be suspended or fastened for study purposes is determined by the average height of the children.

As it is worth while to have pictures constantly before the children during the study of a country I have provided hooks for hanging the strips at two elevations. When they are being viewed, the pictures hang at the lower level and when not being studied they hang at the higher level, in line with the top of the black-board where they do not interfere with its use.

The advantages of the strip over the usual method of hanging or setting pictures on the moulding are that (1) the pictures are presented at the right elevation, (2) short printed descriptions may be written on the board below the picture, (3) pictures are saved the wear and tear incident to passing them, (4) lack of confusion, for the pupils can pass in orderly rows to see the pictures, (5) children are free to view them at their leisure, (6) many pictures may be handled in a unit.

All of the construction work and library work set forth can easily be done by the children with some little help from the teacher.

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SALT EVAPORATION A BIG INDUSTRY

In the production of that indispensable condiment, salt, the United States is happily independent of all other countries. The 38,231,496 barrels of salt produced in 1915 by 14 States, Porto Rico and Hawaii constituted 99 per cent of the salt consumed in the United States. Salt occurs naturally in two distinct ways—as rock salt, in beds or associated with bedded or sedimentary deposits, and in natural brines. The larger part of our salt is obtained by converting rock salt that lies deep below the earth's surface into artificial brines, which are pumped to the surface and there evaporated.

CURRENT MATERIAL FOR THE GEOGRAPHY TEACHER

Icebergs the Deadliest Menace to Ships

There are few matters about which such widespread ignorance prevails as about the ice masses with which the North Atlantic, in the region of the Grand Banks, is bestrewn every spring and summer. The general impression is that this is ice which is formed along the coast of Newfoundland and Labrador and is released every spring, but, in truth, the origin of the icebergs and icefloes is entirely different. Icebergs are huge masses of glaciers formed in the vast Arctic continent of Greenland.

The glaciers slowly but irresistibly press seaward through the Greenland valleys into the ocean, where, when the weight of the outer portion, once it is unsupported by the land, becomes too great, it breaks off from the parent mass, a process called "calving." The calving portion becomes an iceberg, and sometimes these are of enormous size—many miles in extent indeed, and often so vast that they ground on the shoals in the region, until, by the play of the winds, the seas, the currents, and the sun, they become top heavy and tumble over again to break apart into smaller fragments which are ferried southward on the bosom of the Polar current and which ultimately reach the avenues of ocean travel. These floes can only make their escape from the Arctic waters during the brief three summer months.

It takes these ice-masses six or eight months to voyage over the two thousand miles separating Melville Bay, in West Greenland, from the Grand Banks, and the larger bergs, which often ground along Labrador, are even longer on the way.

These floes, and the bergs which are often amongst them, but which are increased later in the season by a vastly larger number of bergs that sail along in solitary grandeur after having had their progress retarded by grounding on shoals or points of land as they came southward, disperse themselves over the Grand Banks and become the very worst sort of menace to ocean shipping. It would be possible to occupy the whole of the space devoted to this article in merely summarizing the cases of ocean steamers which during the past fifty years have met disaster through collision with icebergs in the waters off Newfoundland. All other records in this regard, however, were completely overshadowed by the appalling disaster to the *Titanic*. This mighty master creation, the greatest the world has ever seen, was eliminated in the brief space of a few hours, through the mistaken idea of some of those in authority on board, that she was so staunchly built that she could defy all agencies of nature and race with impunity through ice-laden seas.

As the summer advances and the sun becomes more powerful, the bergs melt into smaller fragments or upset and break into pieces on the shoal ground of the Grand Banks, being then swept into the Gulf Stream, where they lie in the way of the steamers plying east and west and cause the shipping casualties so frequent during these months. Still mightier bergs, however, ground along the coast of Newfoundland in the spring and summer, and move southward in the fall.

Admittedly the worst danger menacing transatlantic travelers in modern days, with steamers of such speed as are plying on the Atlantic, is that of collision with an iceberg in a dense fog. It is morally certain that the mysterious disappearance of big steamers like the *Naronic* and the *Huronian* in more recent years, and of many others previously, is attributable to this cause, for no other agency is usually powerful enough to work the ruin of a modern liner with her cellular bottom and water-tight bulkheads.—[From "The International Ice Patrol," by P. T. McGrath, in the *American Review of Reviews* for September, 1916.]

STRATEGIC VALUE OF THE WEST INDIES

The Danish West Indies consist of the three islands, St. Croix, St. Thomas, and St. John. They are tiny bits of land, their total area being only 138 square miles. St. Croix and St. John are extremely fertile, the former producing the famous "bay-rum." St. Thomas, though less fortunate in the matter of soil, nevertheless holds within its tiny self a pearl of great price—the deep,land-locked harbor of Charlotte Amalie, the most magnificent natural naval base in the whole West Indies with the exception of the Dominican bay of Samana and the Haitian port of Mole-Saint-Nicolas. I shall not soon forget the impression of strategic power which the place made upon me when I visited Charlotte Amalie in the spring of 1912. Our 16,000-ton liner slipped through the narrow opening from the sea and came to anchor in a broad sheet of mirror-like blue water guarded by a continuous circuit of lofty hills. First impressions in this case proved correct, for I subsequently learned that military engineers agree in stating that the conformation of these hills is so remarkably adapted to defensive purposes that a very moderate sum expended upon fortifications would render the island absolutely impregnable. In fact, St. Thomas has often been called the Gibraltar of America.

And St. Thomas' natural strength is still further enhanced by its strategic situation. There are only three gateways which deep-draft ships from Europe employ to enter the Caribbean: (1) the Windward Passage, between Cuba and San Domingo; (2) the Mona Passage, between San Domingo and Porto Rico; (3) the Virgin Passage, between Porto Rico and the tangled archipelago of the Lesser Antilles. The first two are already half way under our control; with the acquisition of the Danish West Indies the last great gateway to the Caribbean would fall entirely into our hands, for St. Thomas stands squarely athwart the Virgin Passage and no hostile fleet could safely pass the menace of its guns.

It is indeed a lordly sea to which these water-gates give access. The Caribbean, lying like a huge elongated quadrilateral between the island-chains to north and east and the mainlands to south and west, stretches nearly 2000 miles from the Yucatan Channel at the entrance of the Gulf of Mexico to the eastern barrier-chain of the Windward Islands, while its average breadth from north to south is over 500 miles. The Caribbean thus well deserves its happy title, "The American Mediterranean."—[From "The Danish West Indies: Keys to the Caribbean," by T. Lothrop Stoddard, in the *American Review of Reviews* for Sept 1916.]

TOLL OF THE COMMERCE THROUGH THE PANAMA CANAL

More cargo passed through the Panama Canal during July than in any month of its operation excepting July, 1915, the quantity being 648,957 tons, as against 705,469. The figures of May and June were 494,150 and 517,791 tons. The tolls for the month were $460,122.95. The traffic in the two directions was pretty evenly balanced, being 296,094 tons from Atlantic to Pacific and 352,863 tons passing Eastward.

The most important item of cargo measured in tonnage, was nitrate, of which 220,887 tons passed Eastward, 155,630 tons to United States ports, 6429 tons to Rotterdam, and the rest mainly to Liverpool, Glasgow and French ports. The next largest volumes were in coal, 56,477 tons to West Coast ports of South America and petroleum of which 27,657 tons passed West to China, Chimanpo, and Australia. There were 25,394 tons of iron and steel and 18,184 tons of machinery also in the West-bound traffic, most of it American en route to Chile, Australia, Hong Kong, Japan and Vladivostok. Over 16,000 tons of sugar came Eastward, nearly all to United States ports.—[*The Americas.*]

Norfolk has a magnificently protected harbor 30 miles inside the entrance to Chesapeake Bay and 187 miles south of Baltimore. In its original condition there were shoals in the channel which gave a minimum depth of 19 feet in the western branch, 15 feet in the eastern and 12 feet in the southern. Im-

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NORFOLK AND NEWPORT NEWS

provement was begun under a project adopted in the Act of 1876 to which there have been frequent modifications and extensions. The amount spent on the earlier projects was $2,633,000. In the Act of 1910 a modified project was included which contemplated a channel 11¾ miles in length with 35 feet minimum low-water depth and a width of 400 feet from deep water in Hampton Roads as far as the Navy Yard, thence up stream on the three branches on somewhat reduced dimensions. This project is now complete, at an additional expenditure of $881,000, and Norfolk now has in addition to the 35-foot channel to the Navy Yard, a 30-foot channel to Lambert Point, 25 feet to the Virginian Railroad bridge and 22 feet to the Norfolk and Western Railroad bridge; in the eastern branch, 25 feet to the Norfolk and Western Railroad bridge and 22 feet to the Campostella bridge; in the western branch, 24 feet to the first bridge and 16 feet for some distance further up stream, also in the western branch 24 feet as far as West Norfolk bridge. These works of improvement give a maximum low-water drafting from the port of Norfolk to the ocean of 35 feet, from the southern branch 22 feet, from the eastern branch 22 feet and from the western branch 24 feet.

The past few years have witnessed the construction of great modern railroad terminals at Norfolk for the coastwise and foreign shipment of coal and other bulk cargoes. There is an active barge traffic in coal, northbound, by both bay and ocean routes, and a growing northbound barge trade in lumber, cotton and other products from North Carolina waters. The city of Norfolk has also under consideration the construction of public water terminals, under plans in charge of a public commission.

Ten miles west of Norfolk harbor is the comparatively new harbor of Newport News, the terminus of the Chesapeake and Ohio Railroad, and the location of large shipbuilding and repairing industries. The port is advantageously located near the affluents of the James River with Hampton Roads. In its original condition the harbor had a low-water depth of 25 feet. The Act of 1902 adopted a project of improvement under which $237,500 was spent for original work and maintenance. The Act of 1910 adopted the present project which authorized a channel 400 feet wide with low-water depth of 35 feet for 3½ miles. This work is now completed at a cost for original work and maintenance, of $471,000. In addition to its important coastwise trade and ship-building industries Newport News is a port of growing importance for the export of grain, coal and agricultural products.—[W. H. Schoff in *Commercial America.*]

RECENT PUBLICATIONS

Essentials of Geography, by Albert Perry Brigham and Charles T. McFarlane. First Book, 266 pages; Second Book, 426 pages. Size 8 x 10 inches. The American Book Company, New York, 1916. Book I, $.72; Book II, $1.24.

The appearance of this series of geographies marks another epoch in geography publication in this country. We have been steadily advancing along this line, and it is a pleasure to all friends of geography to see that the advance is continuing.

The fact that the publishers have adopted the 8 x 10 size for these books seems to indicate that the large old-style, atlas-like geographies are to be discontinued. The small size attempted in the first Tarr & McMurry series seems not to have been successful, although in Great Britain this small size prevails. The 8 x 10 size, which is substantially that used by the new Tarr & McMurry and by Dodge, as well as by Brigham & McFarlane, satisfactorily meets the objections to both the large size and to the small size books, and, we believe, will be generally adopted in this country.

In their manufacture the books are models. The binding is strong and substantial; the paper, presswork, and illustrations are excellent. As soon as the book is opened it creates a highly favorable impression. The colored maps are large enough and are not overcrowded with names. The brilliantly colored relief maps in Book I will not please everyone. There is some question whether the colors used in the physical maps create the impression which is intended. In these maps the lowest land is colored a darker tint than the next two higher levels of land. This might create an erroneous impression; for some reason, looking at these maps, one feels that the light buff tint is lower ground than the darker bluish-green while, as a matter of fact, it is higher.

The illustrations are chosen with exceptional thought and care. Practically everyone tells its own story. The black and white sketch maps are very neat and effective. The small railroad map (Fig. 147 in Book I) is out of date, showing, as it does, only one Pacific railroad crossing the Sierras east of San Francisco, and only two crossing central Washington to Puget Sound. This, on so small a map is, however, a minor matter.

One cannot read the first 50 pages of Book I without feeling that a different treatment might have been more effective. The method employed in the first part of Book II, if applied to Book I, would have impressed the minds of children more. It is pretty well established as a principle of pedagogy that children's minds work from the concrete toward the general. The first 50 pages or so of Book I deal with principles and general ideas which might better be formulated after studies of concrete cases had been completed. Remembering that the first part of Book I is to be used by children of only 10 years of age, it seems doubtful whether such topics as, The Cause of Winds, The Influence of Government on Industry, and definitions of a republic, kingdom, and absolute monarchy are in place. In general, the topics treated in the first part of Book I seem to be too large and require a greater maturity of mind than can be expected in little children.

The pedagogy employed in Book II is unquestionably sound. The plan followed in the second book is stated by the authors as follows: "The principles and forces with which physical geography deal are brought in at appropriate points of application in the regional treatment. Thus, rivers and valleys are studied in a passage that leads to an account of the drainage of North America; volcanoes are studied in connection with the study of a well known volcano, Vesuvius. Wheat, for example, is described as fully as possible in the account of the region where it first appears in a large way, that is, in North Central states. In like manner, iron is treated with Pittsburgh, and irrigation with the plateau states." Experienced teachers will agree with this method of treatment.

The physical-political maps used in Book II are excellent, with the possible question already raised regarding the wisdom of representing higher lands in a lighter tint than that used for the adjacent lower lands. The larger western states have relatively far more cities shown than the eastern states. This might mislead children regarding the extent of settlement and development of the western states unless the teacher introduces the necessary caution. The practice employed in some books of printing a small inset map of one of our states—Pennsylvania or Colorado—along with the maps of foreign countries in order to bring out relative sizes is a good practice. We miss them in the Brigham & McFarlane books.

The style is notably clear and vivid; it could scarcely be better. The topics selected for emphasis are chosen with rare good judgment. The human side of the subject is emphasized, as it should be, although the physical side is not neglected; in fact, the combination seems very nearly ideal. Causes are treated without being overstressed.

The books show, from beginning to end, painstaking care and repeated working over of text. Possibly the delay in the publication of these books which the European War caused has not been entirely unfortunate, for it gave the authors and publishers full opportunity to do their very best in every particular. The brief summaries at the end of sections in Book I are probably helpful: surely the questions at the end of divisions are. The list of useful references is styled "short," yet it is adequate. One closes the books with a feeling that they are a credit to American geography, and set a high standard for future writers and publishers. R. H. W.

ELEMENTS OF MINERALOGY. By Frank Rutley; revised by H. H. Read. Nineteenth edition. D. Van Nostrand Co., New York, 1916. 394 pages. $1.25 net.

The author and the reviser are Englishmen and the book is printed in England by Thos. Murby & Co., London. Part I treats of the properties of Minerals and Crystallography. Part II consists of a description of Mineral Species.

PHYSICAL GEOGRAPHY OF WISCONSIN. By Lawrence Martin. 550 pages; 206 text figures; 41 plates. Bulletin 36 of the Wisconsin Geological Survey.

We select the following excerpts from an editorial in the Brooklyn *Standard Union.*

Prof. Lawrence Martin's *Physical Geography of Wisconsin* deserves much wider reading and notice than it is likely to receive. The author, speaking always by the card and using strict technical terms, does not, however, as so many 'highbrows' and officials appear to, despise facts of human interest and language which common people can understand.

"When one thinks of the millions of the peoples' good money buried in official and statistical reports, never read, and destined ultimately only for the papermakers' vats, to be transformed by chemicals and capital, which might be put to far better uses, into material for another dreary, wasteful round, one is inclined to regard Prof. Martin's book as marking an epoch, a real classic in official, scientific literature.

An idea of the human interest and literary quality with which the book is infused may be gathered from this example:

"The territory and state of Wisconsin have at various times been attached to Indiana, Illinois and Michigan. Wisconsin has included Minnesota, Iowa and the Dakotas. It has possessed and lost the sites of Chicago, St. Paul and Minneapolis, the iron mines of Minnesota, the iron and copper mines of Michigan, the coal and lead mines of northern Illinois, and the rich corn and wheat lands of Iowa, of northern Illinois, and of the Red River Valley in Minnesota and the Dakotas."

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TREE CROPS FOR DRY LANDS

By J. Russell Smith
University of Pennsylvania, Philadelphia

ONE of the greatest and most triumphant agricultural booms in the world is to be found in Africa—the dry-land farming of central Tunis, where the rainfall is less than ten inches. This success is astonishing in the face of the uncertainty, dread, and failure that harass our own as yet unadjusted dry-land agriculture. As an evidence of local failure I would cite the observations of an agricultural scientist on a recent ninety-mile journey in the southern part of the Great Plains, where the rainfall averages twenty inches. In the ninety miles traversed there was but one surviving settler and not even a cattle-ranch. The dry farmers had pushed out the cattlemen, and the recent droughts had pushed out the dry farmers—all but one—in a strip as long as from New York to Philadelphia. Our uncertainties arise under a rainfall of ten to twenty inches. The African's complacency is assured by less than ten inches. Subscriptions have recently been taken up for people living in an average rainfall of sixteen to eighteen inches. Where Simpson failed, the average is seventeen inches. Yet the complacent success in Tunis is in the vicinity of Sfax, where in seven consecutive years the total rainfall amounted to forty-one inches—five and eight-tenths per year.

The Olive in Tunis

The Tunisian rain is a winter rain, which is the best kind for dry farming, but beyond that there are not many extenuating circumstances in the climate. It is so near the Sahara that it is a thorny camel-pasture, and the frequent siroccos of the summer season are fearful driers. There are no permanent streams. The Tunisian success depends upon the fact that the Arabs long ago worked out to a finish the dust-mulch practice (which we recently "discovered" with such a hurrah), and, further, they and their French copyists have applied it to a crop that suits the environment: olives—*a tree crop.*

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*Abridged from the writer's article in Harper's Magazine, May, 1914. Copyrighted 1914 by Harper and Brother. Reprinted by permission.

The Sfax dry-farming boom is an olive boom. I rode out of Sfax in three directions—twelve miles, seventeen miles, and eighteen miles, respectively, and always in olive-orchards. They lined the road on both sides. Near the town they were from forty to eighty years old. Farther out the trees were younger, and the new plantations are still spreading. I rode one hundred miles to the south, and at the end of the journey the gray-green of the olive-trees was still to be seen. Although most of the intervening distance was bare of them, there were enough plantations *en route* to show that it was all olive ground. I passed groups of tenting Arabs on their camels, saw their camps set back a safe distance from the good French road, and their invaluable "ships of the desert" browsing on the scattering thorn-bushes. Here was the life that had for ages prevailed on the edge of the Old World deserts. The nomad in his tents of camel's hair pauses awhile where the browsing is good, then, packing his chattels, his children, and his wives, on the camels, he follows his flock where fancy (and browsing) dictate. Passing these ancient scenes, it was almost uncanny to come suddenly upon a two-thousand-acre plantation of healthy young olive-trees stretching away across the well-tilled plain as far as the eye could see.

In one direction, I was told, the plantings extend almost solidly for one hundred miles. The seven years with the combined rainfall of forty-one inches seem to have had no bad effect on the boom or on the trees. The plantings would be much more extensive than they are if it were not for the fact that the government fears that plantings will exceed labor supplies, and will not, at present, release any more of the camel-range for olive-planting. The government is actually going out and destroying young olive-plantations of the Arabs. This happens because the lands in question were set apart by treaty for the tribal use of the tenting Arab. His use consists in tenting where he pleases, pasturing where he pleases, and planting a patch of barley where he pleases. If he can plant barley, he reasons that he can also plant olives, even if the trees will live a thousand years with care. But the government thinks differently, tears up his trees, and restores the land to the primeval uses prescribed by treaty. This desire of the tenting Arab to settle down where he can be secure (the French give security) is interesting, and the willingness of this hundred-generation nomad to plant trees and wait fifteen years for profits is surprising.

It is the universal practice in this region to water the young tree three times a summer for three summers, and to plant barley in the young orchard for about six winters. Then comes clean culture—the dry-farming dust mulch. The tree begins to bear at six and seven years, but the income is not expected to meet expenses until the trees are fifteen or twenty years old. "The man who plants the olive does not get the profit", they say in Tunis; but it is astonishing how widely they plant them, nevertheless. Here, as elsewhere, the olive has a habit of bearing a big crop one year and a light crop the next, in which it greatly resembles the fallow-year-wheat-year combination of American dry-farming.

This land has almost no value as pasture, and when the government releases it, it is virtually given away; but at twenty-one years of age the seven or ten olive-trees that are on an acre increase its value to $100 or $150. If well cared for, the average yield is from 800 to 1,100 pounds of olives, worth at the present price, from fourteen to twenty dollars to the grower. The gathering of the crop requires from four to six days'—Arab days'—work per acre. The oil yield is thirty or thirty-three per cent of the weight of the olives.

The Tree Crop and The Grain Crop

Among intelligent Tunisians there is no discussion as to which is more certain, a tree crop or a grain crop. They *know* that they cannot depend on grain. It is authoritatively stated that in one locality, even more arid than Sfax, the barley gives in ten years two good crops, three mediocre crops, and five failures, while the olive gives in three years one good crop, one mediocre crop, and one failure—a sixty-per-cent crop advantage in favor of the olive, with less work. This is on the very edge of the Sahara, where the natives have been growing olives for unknown centuries—probably for two thousand years, and it may be longer than that.

Why does the tree crop beat the grain crop in the great fight for scanty water? There are many reasons, and good ones. If, as Napoleon said, victory goes to the army with the heaviest artillery, the water will certainly go to the plant with the longest roots.

The Carob-Tree

Monsieur Trabut, Government Botanist of Algeria, in speaking of the deep-rooted habits of trees, has told me that in a newly dug well he had seen the roots of a carob-tree sixty feet below the surface. The carob fed John the Baptist, the Prodigal Son, and the Scriptural swine. Its nutritive value is undiminished. From that day to this the carob bean has b regular crop in the drier Mediterranean lands, because it is an avid searcher after water, and one of the best crops for arid, unirrigable lands. In Portugal, Spain, North Africa, and many other Mediterranean lands it is still feeding the pig, the donkey, the horse, the man, and it is surprising to find how many Americans have eaten St. John's bread in our Eastern cities, where it is often to be had on fruit-stands.

THE ADAPTIVE POWER OF THE OLIVE

It is the general opinion in Sfax that the olive there is a shallow rooter. Studies of the olive-trees of the Colorado Desert, California, conclusively show that this is the case there. It would be a foolish tree that would send its roots into a bone-dry subsoil such as exists beneath many deserts. The desert tree, particularly the olive-tree, adjusts itself to this environment by developing surface roots that spread over a great area with a network of feeding rootlets ready to seize and hold the slightest shower that moistens the dust. Twenty-year-old olive-trees in the Colorado Desert showed root areas seven to nine times as great as the areas covered by the spread of the branches.

Along with this the olive, like other desert plants, has developed an almost marvelous power of water storage, so that last year's rain is really the important thing for this year's crop.

THE TREE CROP AND DRY FARMING

One great factor of especial interest to the believers in dry farming yet remains to be considered; that is the absolute perfection with which the tree crop fits into the theory and practice of dry farming. The heart of the system is the moisture-saving earth mulch, made by keeping the ground cultivated. This is impossible when wheat or other scattered grain covers the ground, but very easy with tree crops, because the cultivator can go right up to the tree trunks at any and all times. The Tunisian Arabs, and their pupils, the Tunisian French, practise this to perfection, and it is doubtless one of the main reasons why the tree crop is more certain than the grain crop and has survived a seven-year period of six-inch rainfall with almost tropic heat.

When the earth mulch keeps the water in the ground, the tree crop can be adjusted to the amount that is there. Thus the Sfax Arabs long ago found that seven to ten olive-trees per acre could use all the water there was and make as many olives as fifty trees or one hundred trees.

Those are some of the reasons why the dry farmers of Sfax are contentedly extending their plantings in a region of such aridity that we would omit it from our calculations of usable land. In this country dry farming has failed with disheartening frequency on large areas with greater rainfall than that of Sfax, and yet vaster areas with similar rainfall still remain an unchallanged scanty pasturage as the wastes of Sfax were for a thousand years preceding the recent awakening.

THE LESSON FOR AMERICA

The lesson for the American lands of scanty rainfall seems plain. Develop at once a set of crop-yielding trees, so that every dry farmer can increase his chances by trying at least two of them. I do not venture to say what these tree crops should be. That is a question for the experiment stations to determine in the light of the ever-varying local conditions. I do, however, feel qualified to indicate a few probabilities.

On the western and southwestern edges of our arid belt we have rainfall distribution and temperature conditions resembling those of Sfax. The olive-tree thrives in considerable areas of the Southwest. Thrifty groves are to be found in western Texas, Arizona, and California as far up as San Francisco. It is quite possible that our plant-breeders can improve upon the variety of dry-land olive that the Arabs of Tunis inherited from the Romans, and which the Department of Agriculture has introduced into the United States. Mr. Frank Meyer, plant-explorer of the department, has recently sent cuttings of an olive-tree in Crimea that survived 2° F. when all its companions froze. This suggests the possibility of northward extension of the olive territory. The recent tripling of the price of olive-oil, and the rising price of meat and butter, indicate a field for the development of an olive-oil industry here. The labor of picking and handling the crop would certainly be reduced if we could get a hardy olive as large as one recently reported from South Africa, two or three times as large as those commonly grown. There is good reason to believe that agricultural scientists can develop satisfactory olives that will thrive on now virtually unused land, and that would enable us easily to duplicate the olive crop of the rest of the world—if we set out to do it.

Some astonishing evidence has recently come from our own arid Southwest. About twenty years ago there were some olive-plantations made on irrigated lands in districts that may properly be called desert. After the orchards were established, a failure of the irrigation supply led to abandonment. The cottonwood shade trees and the other fruit trees perished, but the olive has lived and thrived for a number of years on the natural rainfall of 8.11 inches per year at Phoenix and 6.88 inches at Casa Grande, Arizona.

These trees have lived in a veritable flood in comparison with a grove that was abandoned at Palm Springs, California, in 1900. This place lies in the Colorado Desert to the east of the San Jacinto Mountains. The annual precipitation "is a scant 3½ inches, with a total of only 0.70 inches for 1903, and a maximum of 9.36 inches for 1905." The 0.70-inch rainfall of 1903 fell in March. It was followed by twelve rainless months and preceded by ten months with a total of 1.40 in November and December, making twenty-three months, including two desert summers with a total rainfall of 2.10 inches. "Scant as this rainfall is, nearly all of it occurs in the six months from October to March, inclusive. During the six summer months, when a temperature of 100° F. is reached almost daily, there is scarcely a trace of rain. That any vegetation should be able to pass through this terrible ordeal of heat and drought seems beyond belief to one accustomed to the plant growths of regions having abundant rainfall; yet many species of shrubs and three species of trees are native in these hot sands."

The twenty acres of olives abandoned there have lived and grown somewhat in competition with desert shrubs on their own ground—sandy ground at that. For four consecutive years—from 1901 to 1904—the rainfall was 2.09 inches, 3.50 inches, 2.90 inches, 0.70 inches. Nor could the trees depend on subsoil waters, for the digging of an eighty-foot well found only dry cobblestone and gravel. While these trees had survived and bloomed, they had not fruited, but a very little irrigation produced a crop on others near by. The desert temperature of 120-122° F. seemed not to interfere at all. As all this was done by varieties of olives from regions of twenty-inch rainfall in Europe, there is hope of the results that may be obtained with care from the African varieties.

Tree Crops and Live Stock

But the dry farmer, especially in the Great Plains region, should be essentially a live-stock farmer, and crops that fit into this scheme are particularly welcome. The mulberry is one of the most fruitful trees man has yet found, and the delight with which pigs and poultry devour the sugary and nutritious fruit would gladden the heart of any agriculturist. In Carolina the farmers say that a mulberry-tree will feed a pig for two months and make him fat. Then there is the honey locust. That hardy and thoroughly acclimatized tree belongs botanically and economically with the mesquite, and both of them belong with the carob. The carob bean, as has been pointed out, is an important crop in the Mediterranean countries, and the American and British farmers pay several cents a pound for it in various patent stock-foods. The carob, mesquite, and honey locusts are alike in being legumes, bearing crops of large beans in which nitrogenous seeds are packed in sugary pulp. The name "honey locust" did not come by chance. The analyses of these three beans are strikingly alike, and show surprising values in comparison with standard stock-foods. They compare as follows:

	Protein	Nitrogen free extract	Crude fibre	Fat
Carob	6.6	59.5	8.7	0.5
Mesquite	10.3	54.7	28.9	0.7
Honey Locust	4.5	69.9	14.5	2.2
Corn meal	9.2	68.7	1.9	3.8
Wheat bran	15.4	53.9	9.0	4.0

These high analyses make it clear why the Algerian farmers have recently got more than a cent a pound for their carob beans, and why the mesquite meal of Hawaii brings twenty-five dollars per ton as food for dairy cows and cavalry horses. There is no more reason why the American farmers should raise wild scrub mesquite than that they should raise wild scrub apples, and it is probably a great mistake for many of them to be bothering with grain when they have at their disposal such a water-hunting, nitrogenous food-factory, already adjusted by nature for the work.

The mesquite is at home in half a million square miles in the Southwest, and the honey locust will grow on a few hundred thousand square miles to the north of the present mesquite limits, and a million square miles eastward to the Great Lakes and the Atlantic. Accurate information about the fruiting habits of the tree is scarce. No one seems to have considered it worthy of attention. I know that cattle eat the beans greedily, and that farmers in many Eastern localities aver that it bears regularly. I have been specifically and reliably informed that a door-yard tree in Maryland has borne six consecutive heavy crops estimated at twenty bushels each. I had eleven two-bushel sacks filled under a tree that I saw in Virginia in 1912. They weighed three hundred pounds, being very bulky. A farmer in Kansas tells me that he has secured four hundred pounds from one tree. If that is the best tree in America, it is a marvelous chance. A wild tree—one of the best of timber trees—that will throw down three or four dollars' worth of cow feed is worthy of the most respectful consideration from agriculturists. Thus far it has been neglected, while attention has been bestowed upon its inferiors.

CONCLUSION.

The Arab has worked out his system and won industrial contentment through his tree crop on the edge of the Desert with a rainfall of less than ten inches. May we not, by taking thought, win a similar agricultural stability in our vast areas of low rainfall where we still pray for rain and take up subscriptions for the industrially unadjusted?

I have mentioned three crop trees for the American dry-farm scientists. I mention them to prove a point, not to make a list. The botanic resources of this and other countries, as reported by plant-explorers and plant-breeders, indicate that there are many, possibly dozens, of trees that should at once become the subject of experiment. I submit that the development of tree crops is an urgent matter to which practically every agricultural experiment station in America should devote a part of its energies. This requires appropriations and the labors of patient men.

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ECONOMIC ASPECTS OF INLAND WATER TRANSPORTATION

By H. G. Moulton

Department of Political Economy, University of Chicago

(Concluded from November.)

IV. . THE FACTS ABOUT EUROPEAN WATERWAYS

THE experience of foreign countries has been repeatedly appealed to as evidence of the great advantages of water transportation. Investigation, however, does not bear out the contention that water transportation in Europe is cheaper than that by rail. The same faulty analysis of *cost* has been made in European countries. It has been assumed that the rates quoted tell the whole story, when as a matter of fact the rail and water rates are based upon entirely dissimilar computations. In Germany, for example, the water carriers do not charge tolls high enough to cover the overhead charges, and in consequence there is required a heavy annual subsidy. In the year 1905, for instance, the waterways of Prussia showed a deficit of $3,523.00 for every mile; while the railways yielded a net profit of $1,814.00 per mile. It is the German policy, indeed, to use the profits from railroads to offset the deficit on the waterways. In view of this can a quotation of mere rates prove waterway transportation actually cheaper than that by rail? Suppose the situation were reversed, and that the railways were run at a heavy loss, while the waterways were conducted at a handsome profit: Would not the rates then show the railways to be more efficient carriers? It must be borne in mind in this connection that since the German government controls both railways and waterways, the fixing of rates is a mere arbitrary matter, and need have no relation whatever to cost of service.

Investigation in detail reveals the surprising fact that none of the canals of Europe and but few of the rivers serve economically as carriers of traffic. When indirect costs are included water transportation is nearly always found to be substantially more expensive than that by rail.

No doubt you are thinking that if what I have just stated be true, how is it possible that the German government, for instance, should adopt such a policy? Surely German science and efficiency could hardly tolerate, much less officially develop, so uneconomic a transportation policy. This question long baffled me in the course of my investigation of German waterway policy. The answer was first suggested to me by the eminent French economist and statesman, M. Colson, and I have since found in several other sources unimpeachable evidence in support of M. Colson's theory. The Kaiser, says Colson, believes that Germany's future is vitally dependent upon the development of her sea-power, and he "is suffering from a delusion" that the development of inland navigation is an absolute essential to the expansion of ocean commerce. Moreover, he virtually compels their development, regardless of the wishes of his subjects. In 1899 the important canal bills were defeated by the vote of the Prussian upper house, whereupon the Kaiser dismissed twenty members of the landtag and appointed others to take their places who were in sympathy with waterway development.

TRANSPORTATION HISTORY OF PAST CENTURY

The transportation history of the past century may be briefly summarized as follows:

In the first half of the nineteenth century the canals of both Europe and the United States were of enormous influence on economic development. During these years whether canals were publicly or privately owned tolls were everywhere levied upon the water traffic sufficient in amount to cover not only the entire cost of operation and maintenance but to cover as well the original cost of construction of the waterway itself. Indeed, since the utter inability of the old-fashioned stageroads to c with them gave the canals a virtual monopoly of traffic, they were exceedingly profitable sources of investment.

But in all the principal countries of the world a tremendous change took place about the middle of the 19th century. The invention of the steam locomotive and the steel rail with its great load carrying capacity, together with the perfection of the telegraph and the telephone and the development of the corporate form of industry, have ushered in a second industrial revolution perhaps even more far reaching in its consequences than the one half a century earlier.

Rapid and economical shipment of goods is no longer confined to trunk line water routes aided by such additional lines as the physical character of a country allows; for by means of a modern railway system traffic may be sent to all the points of the compass, and by virtue of the standard gauge of tracks to any destination, however distant from the original place of origin, without transshipment. In a modern industrial state, where division of labor has been carried to a great extreme and where traffic is assembled from and distributed over widely separated areas, this is of permanent importance. Herein, indeed, lies the tremendous superiority of the railways in the carrying of traffic under modern conditions.

It has been found that in Europe no less than in the United States there has occurred *pari passu* with the development of railways in the third quarter of the nineteenth century a rapid decline in the amount of traffic carried on inland water routes. This decline has continued to the present day in England and the United States, and it has been checked only by the extending of Government subsidies to the waterways. In order to prevent the most complete diversion of traffic from the waterways it has been necessary for Governments to assume all, or nearly all, the fixed charges connected with water transportation, to pay for building, equipping, and maintaining the water routes, and to furnish them free of charge to the water carriers. When thus relieved of all save the mere direct cost of operating the boats, it is usually, though not always, possible for the water carriers to offer rates which enable them to compete with railways, which are entirely self-supporting. Even then, it is not infrequently necessary to protect the waterways still further from railway competition by arbitrarily compelling the railways to quote rates from twenty to fifty per cent higher than those by water as is the case in France and Belgium; and although the cost of transportation by water, when to the rate charged by water carriers are added the taxes levied by the state in support of the waterways themselves, is usually much greater than that by rail, many people have still clung, strange as it may seem, to the belief that canal transportation is much cheaper than that by rail.

There can no longer be any question, however, that so far at least as *canals* are concerned, the cost of transportation, all factors included, is almost universally much greater by water than by rail. It is only in the case of very short canals which connect long stretches of naturally navigable waters that they can have any economic justification at the present time.

In the case of *rivers*, however, the situation may at times be somewhat different. But, after all, river transportation is usually analogous to that by canal, for comparatively few of our streams are really natural highways of commerce. As a rule they are navigable for the purposes of modern transportation, in name only, rather than in fact. So long as the cost of canalization of a river amounts to forty, sixty, or a hundred thousand dollars a mile, it belongs in the same category as a canal. A river like the Rhine, whose banks are firm, whose gradient is gentle, whose water supply is constant, and the cost of regulation of which is almost negligible, may, indeed, be regarded as a *natural* avenue of commerce; but a river such as the Mississippi, with ever caving sides and shifting bottoms, with periods of alternating floods and droughts, and the control of which is, in the opinion of engineers, a greater task than the building of the Panama Canal, is no more to be regarded as a *natural* highway of commerce than any artificial channel whatsoever. The test of the commercial success of such a river must lie in the cost of rendering it navigable for the purposes of modern transportation. It is only in rare instances that river transportation can be made as economical as transportation by rail.

V. POSSIBLE INDIRECT GAINS FROM WATERWAY DEVELOPMENT

The argument that we have just been making relates to the purely transportation feature of waterway development. It remains for us to consider some of the indirect or allied gains that might come from the development of waterways.

By these incidental advantages is meant such gains as would come from the development of waterpower, the prevention of the periodic waste in consequence of floods, and the reclamation of low-lying riparian lands. In a still broader way the problem of river control is bound up with the whole program embraced by the term conservation of natural resources. Waterways, waterpower, forestry, irrigation, reclamation of desert and flooded lands should go hand in hand and be apprehended as one prehensive problem for the nation to solve. This theory must be regarded as usually pertinent in connection with river improvements, though seldom so in the case of canals; and one can be in hearty sympathy with the viewpoint, provided that it is not assumed that the cost of the waterway improvement will be covered in full by the purely transportation gains which accrue, and that the allied benefits will therefore be so much net gain to society. Unfortunately this has been the almost universal assumption of waterway advocates—an assumption which is based on the belief that water transportation costs less than transportation by rail. But if investigation of the Mississippi River, for instance, shows that extensive improvement for transportation purposes would be economically wasteful, it follows that the related aspects of the problem must be viewed in a quite different light. It may conceivably be the case that the improvement of the Mississippi River can still be proved warrantable as a part of a general conservation project; but to prove this involves showing that the gains on these non-transportation grounds would in the main be sufficient to cover the expenditures involved. If the transportation side of the problem thus becomes subsidiary, the engineers must conduct their investigations in ways different from what was appropriate when transportation was the first consideration. To take one case only, the reclamation of swamp lands and the prevention of floods might not require the construction of a fourteen- or a twenty-four-foot channel, or the erection of gigantic locks such as many consider necessary for transportation purposes. Levees alone, constructed at relatively small cost, might prove entirely adequate. Incidentally, the river thus regulated would afford some small transportation facilities. It is possible, also, that a comparatively small *additional* expense would result in a considerable increase of traffic. Hence transportation should still enter as a factor. But in any event it is clear that the problem has to be quite differently conceived when transportation is not the chief end sought, or when the direct benefits of transportation are not sufficient to warrant the project. There is need of some thoroughgoing investigation that will differentiate these aspects of the question.

* * *

THE INFLUENCE OF THE LUMBER INDUSTRY UPON THE SALT INDUSTRY OF MICHIGAN

By Charles W. Cook
University of Michigan, Ann Arbor

Introduction

In the period of over fifty years since the first successful attempt to manufacture salt in Michigan, the industry has shown an almost uninterrupted increase in the quantity of its product.

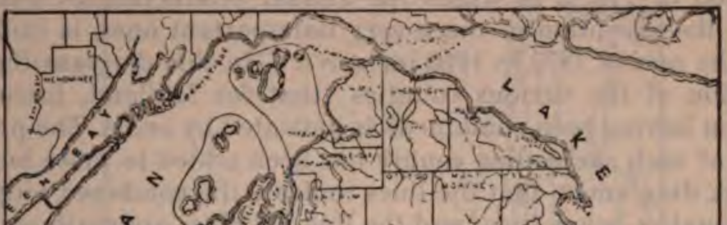

Fig. 1.—Map showing producing salt districts of Michigan. Open circles represent present producing districts. Crossed circles represent former producing districts.

During the greater portion of this time Michigan has ranked first in both quantity and value of salt produced. While the growth of the industry has been continuous, if we neglect the few minor fluctuations, yet its geographical position has been no means permanent. This may be seen from a glance at

1 which shows the districts that were producing in 1910 as well as those in which salt was produced during some previous period, and may be considered as a fairly accurate expression of existing conditions.

Not only have certain districts ceased production and others taken their place, but there have also been numerous ous changes in the relative rank of those districts which have continued to produce. The rise and fall of the various centers of production may be even better appreciated from an examination of Fig. 2 in which the annual production by counties, with the exception of three very unimportant ones, is indicated for the period 1875 to 1910 inclusive.* In this diagram the production of the various counties (that for Midland, Iosco, and Huron having been combined) is indicated by areas. The production of each succeeding county has been added to those below it in the diagram so that the lines indicate the combined output of all counties below them and the line AB gives approximately the total annual production of the state.

Thus we see that Saginaw county, which began production in 1860, reached its maximum in 1882 with an annual output of 1,287,273 barrels. Bay county, beginning a year later, in 1861, also reached its maximum, 1,158,279 barrels, in 1882. Huron county, beginning in 1863, reached its maximum, 326,852 barrels, in 1888. Iosco county, beginning in 1875, reached its maximum, 346,369 barrels, in 1888. Midland county, beginning in 1879, reached its maximum, 80,239 barrels, in 1882. Gratiot county produced from 1882 to 1887 inclusive, the maximum production of 6,186 barrels being made in 1883. Manistee county, beginning in 1881, reached its maximum, 2,670,094 barrels, in 1901. St. Clair county, beginning in 1883, reached its maximum, 1,632,969 barrels, in 1907. Mason county, beginning in 1886, reached its maximum, 851,669 barrels in 1909. Wayne county, beginning in 1895, reached its maximum, 1,168,629 barrels in 1906. In recent years a small amount of salt has been produced at Mt. Pleasant, Isabella Co., in connection with the recovery of bromine and calcium chloride.

This growth and migration of the salt industry has been influenced by many factors, such as the geological structure of the state, the composition of the brines, improvements in the methods of manufacture, the manufacture of table salt, consolidation and large-scale production, the development of the chemical industry, water transportation, lumber industry, etc. Of these various factors the influence of the lumber industry is the most striking if not the most important, and it is only with that factor that the present paper proposes to deal.

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*The diagram is based upon data given in the annual reports of the state salt inspector. The abolition of that office makes it impossible to bring the diagram up to date. This however does not impair its value. These figures have been used in preference to those published by the United States Geological Survey, since the latter include the so-called brine salt used in the manufacture of chemicals and are therefore misleading in the present discussion.

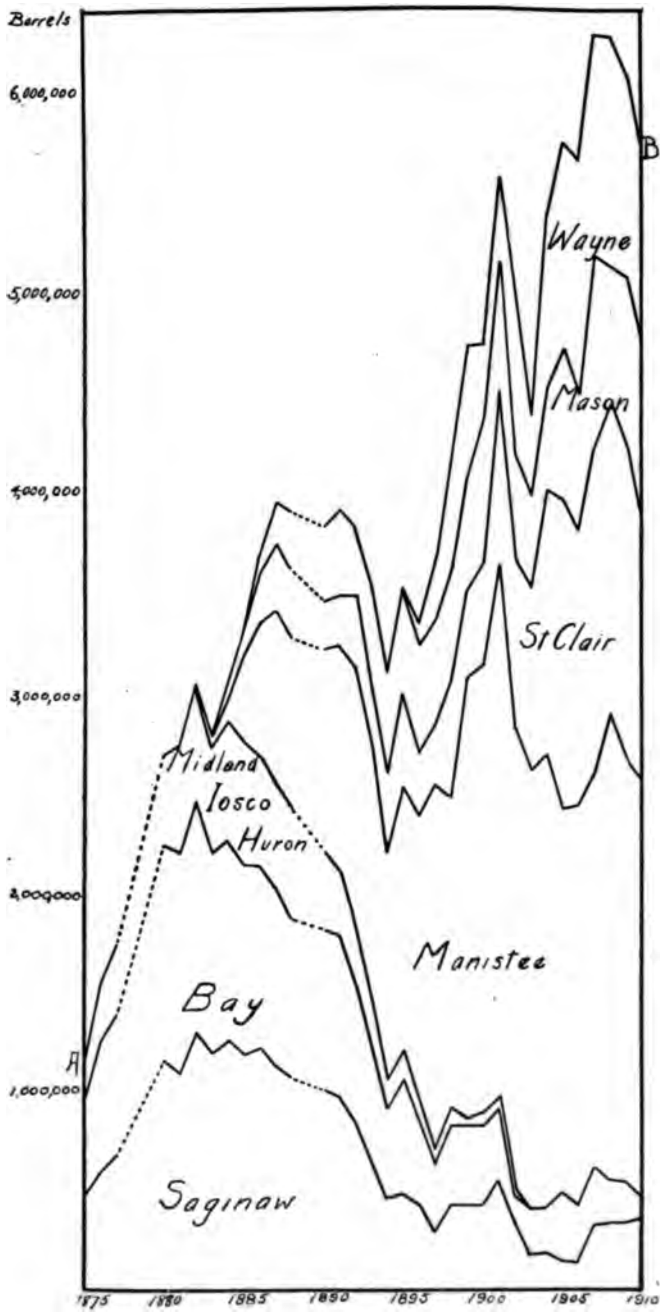

Fig. 2.—Graph showing production of salt by counties 1875-1910. For location of counties see Fig. 1.

RELATIONSHIP OF THE SALT INDUSTRY TO THE LUMBER INDUSTRY

One of the most striking features of the salt industry to even the most casual observer is the close relationship which has existed and to a very decided degree still does exist between the salt and lumber industries. That the very life of the former is dependent upon the existence of the latter is even now maintained by many manufacturers. While this condition may have been true in former years it is perhaps less so at the present time, at least in some districts. In Saginaw, Bay, Midland, Iosco, Huron, Mason, and Manistee counties salt has been produced almost exclusively as a by-product of the lumber industry. In both the Saginaw Bay-Lake Huron and the Lake Michigan districts the salt blocks, that is the plants used for the manufacture of salt, have disappeared with the sawmills and in some instances, as in the case at Pt. Crescent and New River, the towns themselves no longer exist. In recent years one or two blocks have been operated independently, while several have been operated in connection with other industries. In Saginaw county, the increased production in 1907, after years of gradual decline, was due to the construction of a salt block in connection with the glassworks of the Saginaw Plate Glass Co.

If the conditions in any individual district are examined, it will be found that continuous production over an extended period by any one company has been relatively rare. Even in periods of growth the increase is generally the result of the fact that the gain from new plants or companies and the increased production of the others has been greater than the loss from plants ceasing operations. As a typical but simple example let us take the Manistee district (Fig. 3).

Plant No. 1 (see Fig. 3) which was operated by Canfield and Wheeler ceased operations in 1902. No. 2 after having been operated successively by the Eureka Lumber Co. and the Manistee Lumber Co., ceased operations in 1905. No. 3 has been operated continuously by the Louis Sands Salt and Lumber Co. No. 4 was operated successively by the Canfield Salt and Lumber Co., Canfield and Wheeler, and Kitzinger and Babcock, ceasing operations in 1905. No. 5 which was formerly the largest salt block in the state, was operated by the R. G. Peters Salt and Lumber Co., the plant having ceased operations several years ago. The two wells farthest south were taken over from the Canfield Salt and Lumber Co. when they ceased operations at what was known as their Eastlake plant. No. 6 was operated successively by the Union Salt and Lumber Co., the Stronach Lumber Co., and the Dennis Bros. Salt and Lumber Co., ceasing operations in 1905. No. 7 has been operated continuously by Filer and Sons. No. 8 which was formerly operated by Chas. Rietz and Bros., and the Rietz Salt and Lumber Co. is now the No. 2 plant of the Louis Sands Salt and Lumber Co. No. 9 which was formerly operated by the State Lumber Co. is now the No. 2 plant of the Buckley and Douglas Lumber Co. No. 10 has been operated continuously by the Buckley and Douglas Lumber Co.

The above is a comparatively simple case and while by no means as striking as that of Saginaw and Bay counties it will perhaps serve to illustrate the point. In Saginaw and Bay counties over one hundred different salt blocks have been operated in the past. Many if not most of these have been operated by several different companies and many of the companies have operated several different blocks so that the problem is exceedingly complex.

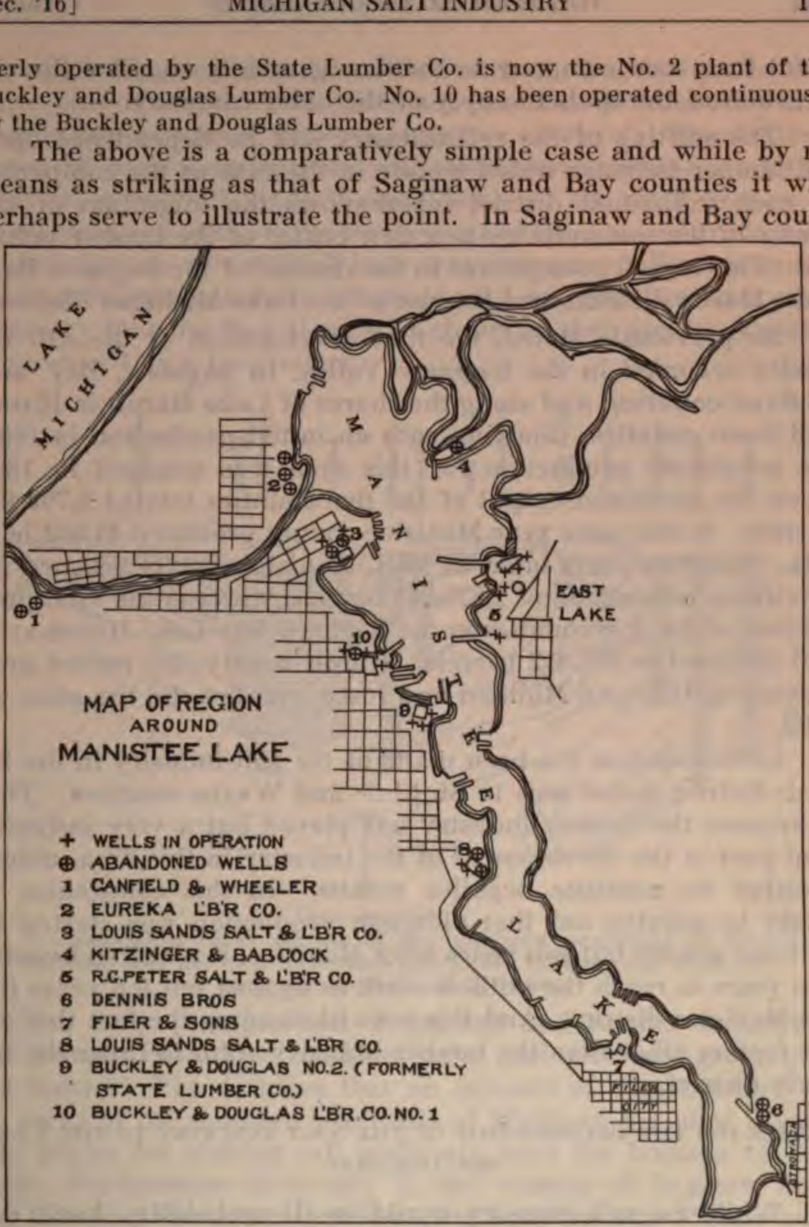
LAKE MICHIGAN
MANISTEE LAKE
EAST LAKE
MAP OF REGION AROUND MANISTEE LAKE
+ WELLS IN OPERATION
⊕ ABANDONED WELLS
1 CANFIELD & WHEELER
2 EUREKA L'B'R CO.
3 LOUIS SANDS SALT & L'B'R CO.
4 KITZINGER & BABCOCK
5 R.G.PETER SALT & L'B'R CO.
6 DENNIS BROS
7 FILER & SONS
8 LOUIS SANDS SALT & L'BR CO.
9 BUCKLEY & DOUGLAS NO.2. (FORMERLY STATE LUMBER CO.)
10 BUCKLEY & DOUGLAS L'BR CO. NO. 1

Fig. 3.

The close association of the salt and lumber industries is indictated by the names of the companies, and the transfer of the plant from one company to another generally signifies the exhaustion of the timber supply of the older company.

The shifting of the salt industry and its dependence upon the lumber industry which we see in the case of the companies in each individual district foreshadows the migration of the center of the salt industry to a new center of the lumber industry. This is well brought out in the decline of the Saginaw Bay-Lake Huron districts and the rise of the Lake Michigan districts.

As previously stated, the first development of the salt industry occurred in the Saginaw Valley, in Saginaw, Bay, and Midland counties; and along the shores of Lake Huron in Huron and Iosco counties. Starting with an initial production in 1860, the maximum production for this area was attained in 1882 when the combined output of the five counties totaled 3,792,468 barrels. In the same year Manistee county produced 41,562 barrels. Nineteen years later, in 1901, Manistee county reached its maximum production of 2,670,094 barrels, whereas the total production of the five counties in the Saginaw Bay-Lake Huron area had declined to 972,412 barrels. Huron county had ceased production in 1897 and Midland and Iosco counties did the same in 1902.

Little mention has been made of the salt industry in the St. Clair-Detroit rivers area in St. Clair and Wayne counties. This is because the lumber industry has played but a very insignificant part in the development of the industry in this area, unless possibly we consider negative results. In this connection, it might be pointed out that although production was started in St. Clair county but two years after Manistee, it required twenty-two years to reach the million mark as against but ten years for the Manistee district. And this notwithstanding the fact that all the factors other than the lumber industry seem to favor the St. Clair district.

CAUSES FOR THE RELATIONSHIP OF THE SALT INDUSTRY TO THE LUMBER INDUSTRY

While the salt industry would in all probability have developed eventually if the lumber industry had been non-existent, certain geographical and geological factors have pre-ordained a very close relationship between the two.

The economic factor of the relationship of price and cost of production early assigned to the salt industry the role of a by-product. That such was the case followed from the method of recovery of the salt in relation to the climatic conditions of the state. With the exception of the relatively small amount of rock salt which has been mined near Detroit in the last few years, the entire output of salt from Michigan has been produced by the evaporation of brines, either natural or artificial. The limited period of high temperatures with abundant sunshine, and the fairly large rainfall made the utilization of the solar process—the evaporation of the brine by the heat of the sun—unprofitable, so that the use of artificial heat was necessary. Furthermore, in order that the enterprise might show a margin of profit it was necessary that the fuel should be cheap or that the salt should be produced as a by-product.

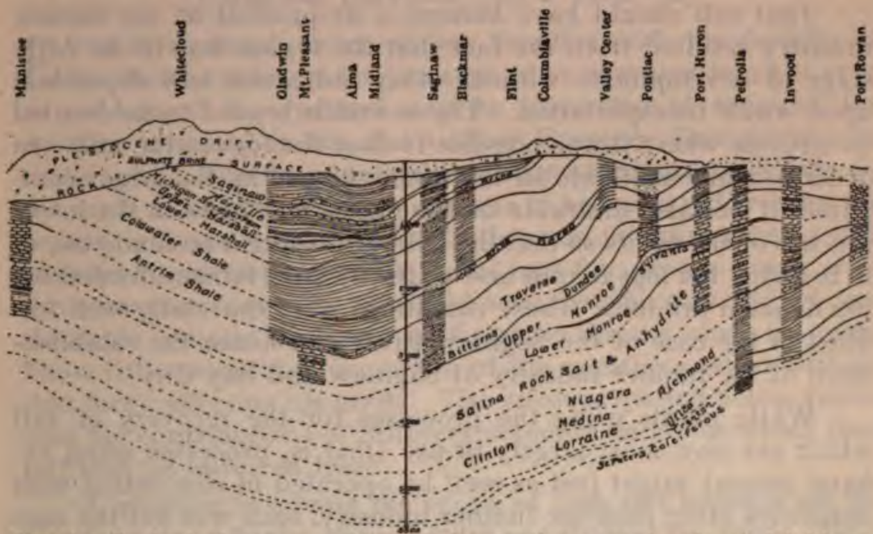

Fig. 4.—Geological cross section of the southern peninsula of Michigan showing that the most favorable places for sinking salt wells are near the borders of the state.

The early juxtaposition of the salt and lumber industries was brought about by a combination of geological and geographical factors. Fig. 4 shows that on account of the structure of the rocks of the southern peninsula of Michigan the most favorable places for sinking salt wells are near the borders of the state. Furthermore it is only in the vicinity of Saginaw and Bay City that the upper brine-bearing horizons (the Parma and Napoleon sandstones) approach the borders of the Great Lakes. A lack of appreciation of the basin structure of the state led to the failure of the first attempt to manufacture salt which took place at Grand Rapids in 1841. It was not until the appearance of Winchell's report in 1860 that there was any basis for a scientific search for brines of sufficient strength.

The year previous to the issuance of Winchell's report the state legislature had attempted to stimulate the search for salt brines by tax exemption and bounties, and under this stimulus a well was started in that year at Saginaw by the East Saginaw Salt Manufacturing Co., the first brine being struck the next February. By July 1862 twenty-three companies were in operation or in the process of construction. In March, 1861, the state tax-exemption and bounty law was so amended that its value to the manufacturers had been practically nullified. However the salt industry had already become so closely connected with the lumber industry that it was removed from the necessity of state aid and continued to thrive.

That salt should have become a by-product of the lumber industry resulted from the fact that the region was in an early stage of development, without other industries and dependent upon water transportation. The sawmills tended to be located on streams where it was possible to float the logs to the mill. In order to make available all the timber owned by the larger companies it was also desirable that the mills should be in the lower reaches of the rivers so that the tributaries might be made use of in bringing the logs to mill and water transportation afforded for the finished product. These conditions were especially well fulfilled in the case of the Saginaw River and hence the establishment of the lumber industry at Saginaw and Bay City.

While plants using the processes for the recovery of salt which are now most largely in use (that is, processes using exhaust steam) might just as well be operated in connection with industries other than the lumber industry, such was not the case with the earlier processes in which the heat was applied directly to the receptacle containing the brine. The utilization of the offal from the sawmills as fuel for the kettles and pans in which the brine was evaporated not only made possible the economical production of salt, but likewise permitted the lumberman to extract a profit from his sawdust and slabs instead of being compelled to dispose of them in burners.

The factors which resulted in the early association of the salt and lumber industries have continued active up to the present time although perhaps with less and less potency. With the shifting of the lumber industry from the Lake Huron to the Lake Michigan districts we have seen the migration of the salt industry in the same direction; and with the decline of the lumber industry, the corresponding decline in the salt industry. However, as has already been intimated, the operation of salt blocks in connection with industries other than lumber, or the independent operation of them, which is now possible as the result of factors with which this paper does not treat, make possible the existence of the salt industry after the lumber industry has become history.

The author is indebted to Mr. R. C. Allen, Director of the Michigan Geological and Biological Survey, for the loan of the block for Fig. 3.

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COLLEGE ENTRANCE EXAMINATION ANSWERS IN GEOGRAPHY

By D. W. Johnson
Columbia University, New York City

EVERY teacher is more or less familiar with the fertility of the student mind under pressure of an examination, but even so readers of the *Journal* may be interested in some of the answers returned in the last College Entrance Examination in Geography. The examination paper included two questions on the earth as a globe, of which one was to be answered; two on the oceans, with one to be answered; three on the atmosphere, with answers required for two of them; and five on the lands, with three answers required. It will be seen that the student had considerable latitude in choosing subjects to discuss, since he might know little or nothing about five of the questions asked without that fact's affecting his grade. The answers quoted below represent the contributions of different students on topics which they felt best prepared to treat.

A question involving the origin of fogs and icebergs on the Newfoundland Banks elicited from one student the vague observation that "Dry moisture in the air cause to become fog," while another gave this vivid pen picture of the origin of bergs:

> "The icebound north, when the sun appears in the Summer, cracks open and huge masses of ice at the border and at the mouth of glaciers break off and float down the ocean."

The question relating to the physical geography of the ocean which gave most trouble was included in a list of definitions required, and called forth such replies as the following:

> "A bore is a steep slope in the ocean's bed."
>
> "A bore is the equal opening in the tubes of thermometers."
>
> "Where the elements continually wear at some rock and weathering takes place, is called a bore."

The origin of the salt in Great Salt Lake was variously accounted for. One student describes the lake as formerly "a salt inland sea" which later became "a large inland sea," thus:

> "At one time the Great Salt Lake was a salt inland sea with an outlet to the Pacific Ocean. On account of land elevation or an earthquake the outlet to the ocean was broken off and it became a large inland sea."

Another, more fertile in invention, writes:

> "Salt in any lake or ocean is due to minerals. The Great Salt Lake in Utah was formed by a glacier which transplanted many minerals of different varieties. The rain, falling into such an excavation, mingled with the minerals, which it dissolved into salt."

Replying to the question "What changes in natural conditions would make the lake fresh?", one candidate says:

> "If evaporation would take salt with it when the water evaporates, when possible, the water would sometime to come become fresh water."

Among the dangers incident to life on the banks of a mature river, the following is given:

> "The river may overflow the land, break the levees, and often changing its course, a planter may find his plantation a floating island."

Another part of the question relating to mature rivers read: "Would you rather live on the inside or the outside of a bend in the river? Why?" Many students preferred the outside of the bend, one explaining his preference in these words:

> "I would rather live on the outside of a bend in the river because the inside I am likely to parish on the inside by flood."

The choice of the following candidate is not wholly apparent:

> "But should danger prefail as on the Mississippi, surely I would not want live in side of the bend. Since dangers are not everywhere still you may chose inside."

Other replies to questions on "The Lands" contained the information that "a fjord is a steep mountain," "the fall line is the boundary between an uplifted and degrading portion of the earth's crust," and "residual soil is soil after being used by plantation, or exhausted soil." In response to a question as to what "peculiarities of topography are commonly associated with glacial erratics," one student wrote:

> "Glacier erratics are usually associated with wide level plains covered with rocks and very often petrified animals of the ancient ages are found in these states."

But the most striking contributions relate to the section on "The Atmosphere." Isotherms are defined as "lines on which the change of time is reckoned," and as "lines marking the air currents." Horse latitudes are "the regions where the heat that has risen in the region of the thermal equator piles itself up." A request to define the term "anti-cyclone," brought highly variable results, among which were the following:

> "A cyclone may meet an opposing gust of wind which causes it to whirl in a different direction. This is called an anti-cyclone."
>
> "An anticyclone is where cool air rushes in to fill a lowland."
>
> "The anticyclone is that stillness which occurs before the cyclone."

As an explanation of "why lowlands under the trade wind belts are usually deserts," this statement was given by one writer:

> "Because the wind makes it dry and deserts are nothing but dry lands; and since there can not be or there are not any natural resources, no one could feel comfortable in such a place."

A question on "prophesizing the weather," as one student expressed it, called forth two answers worth repeating. It was required to explain why weather predictions sometimes fail. One answer was:

> "If their are conditions for producing clowdy weather he predicts clowdy weather. But when the anticyclones come on without having watched out for them, it will interfere with the cyclonical rain coming, sometimes."

Some credit should perhaps be allowed the boy who wrote:

> "As to the reason for frequent failure on the part of the forecaster, I can only say that 'Man is not infallible.'"

Eighty-seven students took the examination. Of these about one-half (forty-four) received grades of 60% or above, and one-half (forty-three) grades below 60%. Of the former group eighteen received grades above 80%. Not any of the answers quoted above were made by the fortunate eighteen. Of the group falling below 60%, twelve had grades lower than 30%. Most of the answers quoted were made by these twelve. Five of the twelve were recommended by their teachers as ready to take the examination, five others had the teachers' consent to take it, while two entered the list on their own responsibility.

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THE PORT OF KOBE

By Walter N. Lacy
Foochow, China

YOKOHAMA, Kobe, and Nagaski are the three ports of Japan most familiar to the general traveller. This is because all three of them are touched by most or all of the steamers plying between China and Japan and North America to the east, and Europe to the far west, and of these three Yokohama is generally given credit for being the leading port of Japan. A day spent in each of these ports recently has led the writer to the conclusion that Kobe is the one naturally best suited to develop into an important port; also to the conclusion that today Kobe is commercially more important than Yokohama—a conclusion that was verified by one of the ship's officers who stated that more shipping is now handled at this port than at Yokohama. Opportunity was not had for the acquisition of statistics to show what has been done, nor of customs reports to show how the city ranks commercially; all that is attempted in this paper is the record of a few observations made from the ship while in the harbor for a few hours.

Kobe is situated on the southern coast of Nippon, the largest of the islands of Japan, and near the eastern end of the Inland Sea of Japan. Although the city has a population of over 300,000, and but slightly less than that of Yokohama and about twice that of Nagaski, it is not mentioned among the "Principal Cities of Japan" described in Rand, McNally & Co.'s 1916 *Pocket Atlas of the World.* Yokohama derives its chief importance, no doubt, from the twofold advantage of its location as the port of Tokyo —the capital of Japan and the largest city in Asia—and as the port nearest to the coast of North America; hence it is the first point of call for westward-bound trans-Pacific steamers, and furnishes the last chance for passengers, freight, and mails to catch steamers bound for the United States and Canada. Kobe derives its chief importance from its location, to which is added splendid harbor facilities: it is centrally located to the densely populated region south of the mountain range which forms the backbone of the island; and with the cities and towns of this region, in both directions from Kobe, it has good rail connections. It is some twenty-four hours nearer China and Korea than is Yokohama and is therefore the eastern terminal for steamer lines connecting Japan with Tientsin and Fusan; it is but a short distance by rail from Kanagasaki, on the north side of the island, which is about thirty-six hours from Vladivostok, and hence

Kobe is the port of reshipment for American goods destined for Siberia. Kobe is also the port for Kyoto and Osaka, the one the ancient capital and today the second city of the empire, while the other is Japan's greatest manufacturing city; Moji and Shimonoseki, at the western entrance to the Inland Sea, are some twelve or fifteen hours nearer the ports of the Asiatic mainland than is Kobe, but have less satisfactory harbor facilities for trans-shipping. These facts all conspire to further the commercial development of Kobe.

The city of Kobe lies spread along the narrow plain at the foot of a wall of mountains some 1500 feet in height, and facing a crescent shaped bay on the north of Osaka Bay. Viewed from the harbor there appears to be little width to the city, as it begins to climb the mountain slopes, but great length along the water front. But this water front presents the most commercial aspect of any water front that the writer has seen in Japan. Towards the western end of the harbor large ship-building yards are to be seen, including a 7000 ton floating dock, and there is abundant evidence that Kobe is developing its ship-building and machine-manufacturing industries. In the central part of the water front four or five large stone piers are at present being constructed, extending about a thousand feet out into the harbor, and equipped with derricks and warehouses for the handling of freight; these will soon reduce the number of steamers that must tie to buoys in the harbor and transfer freight to lighters for rehandling at the shore. At a distance of half a mile from the shore a stone breakwater has been built to serve as a partial protection to shipping in the harbor; the natural wall of mountains affords this protection on the north and east, from which the stormiest winds probably come. Thus it is seen that the people of Kobe are artificially increasing the advantages which nature has already given their city.

A large part of the freight which passes through this port is consigned to or received from China, Korea, and Siberia, and is trans-shipped here to or from steamers plying between the Orient and America. British and Japanese steamers at present have a practical monopoly on the Pacific, yet they carry chiefly American goods to and from the Asiatic markets: practically the entire cargo of the British vessel on which the writer recently crossed the Pacific consisted of American goods. There was a large shipment of cotton machinery going from Newton Upper Falls, Mass., to equip cotton mills at Tientsin; there were several hundred bales of leather "M'f'd in U.S.A." going to Moscow, via Vladivostok, to be used largely for saddles; there were about a hundred casks of cocoanut butter from Chicago, destined for Vladivostok. All these were trans-shipped at Kobe to go by local steamers to Tientsin and Vladivostok. There was also a considerable shipment of general merchandise unloaded in Kobe, destined for Tientsin, Korea, and parts of Japan, and several score sacks of bones—the product of American slaughter houses to be used in the manufacture of paper by the Japanese. But yet more interesting, perhaps, because of the circuitous route necessitated by war conditions, were the thousand sacks of parcels post mail from London and Liverpool for Petrograd and Moscow, sent "via Canada and Kobe" (as the sacks were marked).

Thus, while British and Japanese steamers are practically the sole carriers in the trans-Pacific trade, American goods are finding a market in Oriental cities; war conditions have increased the trans-Pacific shipping and the trans-shipment in Japanese ports; and Kobe is growing, because of her position and her harbor facilities into the chief commercial port of Japan.

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A RECOMMENDED LIST OF ESSENTIALS IN PLACE GEOGRAPHY

Prepared by Committee of Chicago High School Teachers composed of V. C. Bell, T. M. Davies and H. D. Smith.

1. *Mathematical Points, Lines and Divisions.*—North Pole, South Pole, Equator, Tropic of Cancer, Tropic of Capricorn, Arctic Circle, Antarctic Circle, Torrid Zone, North Temperate Zone, South Temperate Zone, North Frigid Zone, South Frigid Zone, Prime Meridian, Meridian 180°, Meridian 90°W., Meridian 90°E., Parallel 40°South, N. Hemisphere, S. Hemisphere, E. Hemisphere, W. Hemisphere.

2. *Continents.*—North America, South America, Europe, Asia, Africa, Australia, Antarctica.

3. *Oceans.*—Atlantic, Pacific, Indian, Arctic, Antarctic.

4. *Seas, Gulfs, Bays, etc.*—Baffin Bay, Bering Sea, Puget Sound, Gulf of California, Hudson Bay, Gulf of Mexico, Caribbean Sea, Gulf of St. Lawrence, Chesapeake Bay, Delaware Bay, Panama Bay, Baltic Sea, North Sea, Finland Gulf, Bothnia Gulf, Irish Sea, Bay of Biscay, Mediterranean, Black Sea, Adriatic Sea, Aegean Sea, Sea of Marmora, Sea of Azov, Okhotsk Sea, Japan Sea, Yellow Sea, South China Sea, East China Sea, Bay of Bengal, Arabian Sea, Persian Gulf, Gulf of Aden, Red Sea, Java Sea, Gulf of Guinea.

5. *Islands and Groups of Islands.*—Aleutian Isles, Vancouver Island, West Indies, Cuba, Hayti, Porto Rico, Jamaica, Long Island, Newfoundland, Greenland, Tierra Del Fuego, British Isles—Great Britain, Ireland—Iceland, Azores, Canary Islands, Corsica, Sardinia, Sicily, Malta, Crete, Cyprus, Japanese Islands, Formosa, Ceylon, East Indies, Sumatra, Java, Borneo, New Guinea, New Zealand, Philippines, Samoa Islands, Hawaiian Islands, Guam Island, Cape Verde Islands, Madagascar, Tasmania.

6. *Straits, Channels, and Sounds.*—Bering Strait, Yucatan Channel, Florida Strait, Long Island Sound, Mackinac Strait, Strait of Magellan, Kattegat, Skager Rack, English Channel, Strait of Dover, Gibraltar, Messina Strait, Bosporus, Dardanelles, Korea Strait, Malacca Strait, Sunda Strait, Bab-el-Mandeb, Mozambique Channel.

7. *Peninsulas.*—Alaska, Lower California, Yucatan, Florida, Nova Scotia, Labrador, Scandinavian, Jutland, Spanish, Italian, Grecian, Crimea, Balkan, Kamchatka, Korea, Indo-China, Malay, Arabian, Asia Minor.

8. *Isthmuses.*—Panama, Suez, Tehuantepec.

9. *Capes.*—Cod, Hatteras, Horn, Lands End, Good Hope, North Cape.

10. *Plains.*—Great Central of N. A., Atlantic Coastal, Valley of California, Llanos, Selvas, Pampas, Lowland of Europe, Hungarian, Lombardy, Siberian, E. China, N. India, Mesopotamia.

11. *Plateaus.*—Columbia R., Colorado, Alleghany, Cumberland, Piedmont, Ozark, Mexican, Bolivia, Central Africa, Abyssinia, Tibet, Pamir, Deccan.

12. *Mountain Systems and Ranges.*—Cordilleras, Rocky, Sirra Madre, Sierra Navada, Cascade, Coast Ranges, Appalachian, Adirondack, Andes, Brazilian, Scandinavian, Pennine, Alps, Pyrenees, Cantabrian, Apennine, Carpathian, Caucasus, Ural, Atlas, Himalaya, Hindu Kush, Australian Alps.

13. *Peaks.*—McKinley, St. Elias, Rainier, Shasta, Lassen, Whitney, Mitchell, Orizaba, Chimborazo, Cotopaxi, Aconcagua, Blanc, Matterhorn, Etna, Vesuvius, Hecla, Kilimanjaro, Everest, Ararat, Sinai, Fujiyama, Mauna Loa.

14. *Deserts.*—Great American, Atacama, Sahara, Kalahari, Gobi, Arabian, Australian.

15. *Lakes.*—Great Bear, Great Slave, Superior, Michigan, Huron, St. Clair, Erie, Ontario, Champlain, Great Salt, Nicaragua, Titicaca, Ladoga, Chad, Victória Nyanza, Tanganyika, Nyassa, Caspian Sea, Aral Sea, Baikal, Dead Sea.

16. *Rivers.*—Mackenzie, Nelson, Saskatchewan, Red River of the North, St. Lawrence, Ottawa, Niagara, Detroit, St. Clair, St. Marys, Merrimac, Hudson, Delaware, Potomac, Mississippi, Red, Arkansas, Ohio, Tennessee, Cumberland, Missouri, Rio Grande, Colorado, Sacramento, Columbia, Snake, Frazer, Yukon, Orinoco, Amazon, Madeira, Sao Francisco, Plata, Parana, Dvina, Vistula, Oder, Elbe, Weser, Thames, Rhine, Clyde, Seine, Loire, Tagus, Tiber, Rhone, Po, Danube, Dnieper, Don, Volga, Nile, Niger, Congo, Orange, Zambezi, Ob, Yenesei, Lena, Amur, Hoang Ho, Yong-tse Kiang, Mekong, Brahmaputra, Ganges, Indus, Euphrates, Tigris, Murray.

17. *Countries and States.*—Canada, British Columbia, Alberta, Saskatchewan, Quebec, Manitoba, Ontario, New Brunswick, United States—Maine, New Hampshire, Vermont, Massachusetts, Tennessee, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky, Arkansas, Louisiana, Texas, Oklahoma, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, North Dakota, Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, California, Alaska, District of Columbia, Mexico, Central America, Panama, Colombia, Venezuela, Guiana, Brazil, Paraguay, Uruguay, Argentina, Chile, Bolivia, Peru, Ecuador, Russian Empire, Russia, Norway, Sweden, Denmark, England, Scotland, Wales, Netherlands, Belgium, German Empire, France, Spain, Portugal, Switzerland, Austria-Hungary, Servia, Rumania, Bulgaria, Turkish Empire, Greece, Morocco, Algeria, Tripoli, Egypt, Sudan, Abyssina, Guinea, Belgian Congo, Union of South Africa, Siberia, Turkistan, Syria, Palestine, Persia, Afghanistan, India, Siam, Chinese republic, China, Manchuria, Korea, Japanese Empire, Japan, New South Wales, Victoria.

18. *Cities.*—Halifax, Quebec, Montreal, Ottawa, Toronto, Winnipeg, Boston, Fall River, Lowell, Providence, New Haven, Worcester, New York, Brooklyn, Albany, Rochester, Buffalo, Philadelphia, Pittsburg, Newark, Jersey City, Paterson, Washington, Richmond, Charleston, Atlanta, Savannah, Mobile, Birmingham, Memphis, Louisville, New Orleans, Galveston, San Antonio, Cincinnati, Columbus, Cleveland, Toledo, Indianapolis, Chicago, Detroit, Grand Rapids, Milwaukee, Minneapolis, St. Paul, Duluth, St. Louis, Kansas City, Omaha, Denver, Salt Lake, Seattle, Portland, San Francisco, Los Angeles, Oakland, San Diego, Mexico, Vera Cruz, Havana, Bogota, Bahia, Rio de Jan-

eiro, Montevideo, Santos, Buenos Aires, Santiago, Valparaiso, Lima, Quito, London, Liverpool, (Eng.) Birmingham, Manchester, Portsmouth, Newcastle, Bristol, Sheffield, Cardiff, Glasgow, Edinburgh, Dublin, Belfast, Paris, Marseilles, Lyons, Bordeaux, Le Havre, Madrid, Barcelona, Lisbon, Oporto, Brussels, Antwerp, The Hague, Amsterdam, Rotterdam, Copenhagen, Christiania, Stockholm, Petrograd, Moscow, Odessa, Warsaw, Kiev, Berlin, Hamburg, Bremen, Frankfurt, Cologne, Munich, Dresden, Leipzig, Breslau, Stettin, Vienna, Budapest, Prague, Trieste, Rome, Genoa, Milan, Turin, Venice, Naples, Palermo, Bukarest, Constantinople, Athens, Alexandria, Cairo, Port Said, Algiers, Tunis, Cape Town, Johannesburg, Kimberley, Smyrna, Damascus, Jerusalem, Mecca, Aden, Teheran, Calcutta, Bombay, Madras, Bangkok, Singapore, Peking, Canton, Shanghai, Hong Kong, Tientsin, Hankow, Tokyo, Yokohama, Osaka, Vladivostok, Manila, Batavia, Sydney, Melbourne, Adelaide, Auckland, Honolulu.

19. *Miscellaneous.*—Great Interior Basin, Gulf Stream, Japan Current, Labrador Current, Grand Bank, Grand Canyon, North Magnetic Pole, Klondike, Yosemite Valley, Yellowstone National Park, Khaibar Pass, The Prairies, Niagara Falls, Victoria Falls, St. Anthony's Falls, Stanley Falls, Suez Canal, Panama Canal, The Caspian Steppes, The Tundras, The Fall Line, The Everglades, Death Valley, Salton Sink, Kaiser Wilhelm Canal, Erie Canal, Soo Canals, Welland Canal.

CURRENT MATERIAL FOR THE GEOGRAPHY TEACHER

Baltimore Harbor and Channel

The port of Baltimore is 11 miles distant from Chesapeake Bay and connected with it by the Patapsco River. Above the city the river is a narrow and shallow flowing stream, while below it is an inlet of Chesapeake Bay, varying in width from one to four miles. Before improvement by the Federal Government there was a low-water depth in Patapsco River of about 17 feet and vessel cargoes frequently had to be lightered about 14 miles below the city from deep water in the bay.

The original project of improvement was adopted in 1836. It authorized the deepening of the harbor of Baltimore without specifying dimensions. Under four later projects the harbor and channel were successively deepened and widened at a total cost of $4,776,000. The present project for the Baltimore channel was adopted in 1905. It provides a low-water channel 35 feet deep and 1,000 feet wide between the 35-foot contours in Chesapeake

Bay and the same depth, 600 feet wide, up to the Patapsco River as far as Fort McHenry, with an anchorage basin 35 feet deep, 600 feet wide and 3,500 feet long. The total length of the dredged channel amounts to about 24½ miles. The work is now complete at a total construction cost of about $3,441,000 or $330,000 less than the estimate, and Congress provides an annual allowance for maintenance. The so-called inner harbor of Baltimore is in course of improvement by the city, and upon completion of work now undertaken the channel depth of 35 feet will be carried to most of the wharves along the water front. The city has also expended $6,160,000 on municipal docks and has available $5,000,000 more for extending the system.

A subsidiary harbor for Baltimore which will, no doubt, be of great value is Curtis Bay, another tidal arm of the Patapsco River about six miles southeast of the present harbor. The channel is 30 feet deep, 250 feet wide and a little over two miles in length. There is considerable traffic in sugar at Curtis Bay, and the Baltimore and Ohio Railroad has constructed a coal terminal. Spring Garden Harbor is another tidal arm of the Patapsco to the south of Baltimore, navigable for about four miles, with a channel 27 feet deep and 150 feet wide, and a turning basin at the upper end. There is considerable traffic in brick on this harbor, and the Western Maryland Railway has built an extensive coal terminal there.

Altogether, therefore, Baltimore is provided with three connecting harbors, a main ship channel of 35 feet, Curtis Bay 30 feet and Spring Garden Harbor 27 feet, all susceptible of ultimate development to uniform dimensions.—[W. H. Schoff in *Commercial America.*]

THE NIZHNI-NOVGOROD FAIR OF 1916

In spite of the considerable modernization of trade methods in Russia during the last forty years, fairs, a mediaeval form of concentrating and marketing goods, have survived and are still playing an important, though gradually declining part in that vast Empire.

Irbit Fair, in Irbit, Province of Perm, Kiev Contract Fair, in Kiev, Epiphany Fair in Kharkoff, but above all the yearly Nizhni-Novgorod Fair, in Nizhi-Novgorod on the Volga and Oka rivers, are even now of great importance in the internal trade of the country.

As regards the significance of this latter fair for international trade, while recognizing that in transactions of Russia with the Orient, in marketing of certain kinds of foreign goods, and for the sale to foreign buyers of such raw materials as furs, hides and skins, it is of considerable importance, one must not exaggerate the necessity of direct participation of American firms interested in the distribution of their manufactures on the Russian market in this Fair.

Originated long before the era of railways and steamship navigation on the internal waterways of Russia, the Nizhni-Novgorod Fair used to bring together European and Oriental merchants with those from all over Russia. With the development in the Empire of modern transportation facilities, telegraph and telephone communication, large credit institutions, etc., the traditional part played by the Fair is losing ground in an ever increasing number of articles. The establishment of permanent warehouses by the large Moscow textile firms, supplying the demand for textiles all the year round, in such centers as Omsk for Siberian trade and Ufa for the Urals, has resulted in the considerable decrease of the turnover at the Fair in textiles, of late. Again, the proposition, already submitted for consideration of the Ministry of Trade and Industries, to create at some central point in Russia such fur auctions as would centralize the bulk of the country's fur trade, is threatening another important commodity dealt in at the Fair in huge quantities. Tea trade, except in brick tea, has for some time been diverted to large wholesale firms specializing in that branch of commerce.

No doubt that conditions resulting from the present war have demonstrated in a pronounced way that even the old traditional Nizhni-Novgorod Fair must give way to the powerful influence of modern efficient business methods. However, in view of the fact that the business transacted at this year's Fair throws an interesting light upon the general conditions of demand and supply in Russia, as also upon the prevailing prices, a short review of the Fair is given herewith:

The chief feature of this year's Fair was the enormous shortage of goods, resulting from Russian industries producing mainly war supplies, also the depletion of reserve stocks of past years, along with the difficulties of transportation. In comparison with the Fair of 1914, the last normal year, the quantity of goods brought to the Fair was already in 1915 22.7% smaller, and in 1916 this shortage increased to 36%. Similarly the number of firms participating in the Fair, 2,920 in 1913 and 2,653 in 1914, decreased to 2,082 in 1915 and as few as 1,496 in this year's Fair.

Considerably higher prices account for the big turnover, in spite of the small supplies. Of iron goods there was 50% less than last year; of anvils and forge bellows there was only 15% and of hunting guns 40% of last year's supply. The quantity of sewing machines and typewriters brought to the Fair was just 10% of last year's, whereas the prices were some 200% higher.

The transactions in chemicals show enormous increases of prices when compared with those of 1915.

As regards the textiles, of cotton goods there was delivered only about 20% of the usual quantity, which supply was bought out with feverish haste at very high prices. With regard to cloth and woolens the position was still more difficult as even in normal times Russia has to rely to a great extent on foreign raw material; whereas the demand for the army is of enormous proportions, the supply of foreign wool has been made difficult and the home production owing to decrease of country sheep stock has become much smaller. In consequence of this great shortage of woolens for private use, rough woolens used by peasants sold at about 270%, and finer woolens at about 360% higher than in 1914, and as much as 190% more than in 1915.

The flax crop of Russia in the last two years, owing to the occupation of some western provinces of the Empire, has been much below the normal. This, along with the increased demand for linen for the army, resulted in only hemp fabrics being offered for sale, these being produced by the peasants in quite considerable quantities. Generally speaking, in textiles peasant cottage producers have brought to the Fair quantities considerably larger than heretofore, but not satisfactory from a quality point of view.

The demand of Caucasus and Persia for bright, Oriental fabrics, requiring special dyes, could only be satisfied to a very small extent, and at fabulous prices, owing to either complete shortage or impossible prices for certain kinds of dyes.

Large business in furs was characterized by speculation based on expected foreign and domestic trade opportunities. "Karakul" furs were brought to this year's Fair in a record quantity of about three million skins, but were released for sale only in small lots and with a constantly growing tendency of prices. —[*The Americas* for Oct.]

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NEWS NOTES

NEBRASKA COUNCIL OF GEOGRAPHY TEACHERS

Thursday, November 9, 1916, was a red letter day for Geography and geography teachers at the Nebraska State Teachers' Association at Omaha.

The first event of the day was a meeting of the Council at the Hotel Rome from eight to ten o'clock in the forenoon. This session was exclusively for those especially interested in geography teaching and, despite the early hour, was attended by nearly fifty people, representing the State University, the four State Normals, several denominational colleges, and the principal city schools. The Nebraska Council had three committees at work to prepare a systematic course of study in geography extending from the lower grades through the High School. The preliminary reports given by the respective chairmen,—Miss Rose Clark, Peru Normal, on Geography in the Grades; Miss Jeanette C. Nelson, University of Nebraska, on Geography in the Junior High School; and Professor A. J. Mercer on Geography in the High School,—proved very interesting and instructive. The committees were continued, so within another year results of great value are expected. Professor E. E. Lackey presented a brief report on Geography Measurements that attracted much attention. This meeting also gave the members of the council opportunity to meet Professor Whitbeck at close range. His talk was rich in suggestions for the organization and was most highly appreciated.

The other meetings of the day followed in rapid succession. Professor Whitbeck gave addresses at three large section meetings at each of which geography was emphasized. The session of the Geography Section, presided over by Professor Mercer was one of the largest of the State Association. The program follows:

"Motivating Geography"—Miss Sue Wilson, Lincoln.

"The Relation of Geography and Geology"—Miss Anna L. Hinterlong, University of Nebraska.

"Essentials of Geography"—Hon. A. O. Thomas, State Superintendent.

"The New Movement in Geography"—Professor R. H. Whitbeck.

There were about 450 in attendance at this meeting and a number were turned away on account of lack of room. The officers elected for next year are:

Professor N. A. Bengtson, University of Nebraska, President.

Miss Elizabeth Bettcher, Wayne State Normal, Vice President.

Miss Olive Griffith, Blair, Secretary.

The last geographic meeting of the day was featured by a lecture illustrated by motion pictures on Nebraska Resources by Professor G. E. Condra of the University of Nebraska, at the City Auditorium. This meeting was attended by several hundred and demonstrated the use of new illustrative material in geography teaching.

Summarizing, it is estimated that at least a thousand teachers heard Professor Whitbeck and that nearly fifteen hundred heard some phase of geography ably discussed at this year's meetings. The Council membership has more than doubled and plans for next year are already well under way. The Council movement is producing results in Nebraska. N. A. BENGTSON, State Leader.

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MEETING OF THE MINNESOTA GEOGRAPHY TEACHERS

The Minnesota Council made an excellent showing at its meeting in St. Paul on November 3rd. The meeting was held in the Hotel St. Paul. Fully 300 teachers were present. The speakers were Supt. L. L. Everly of St. Paul; Miss Bessie Knight of Minneapolis, and Prof. R. H. Whitbeck of the University of Wisconsin. The dominant note in all of the papers was The Minimum Essentials in Geography. All emphasized the need of selecting a certain body of geographical facts and principles and then making sure that these essentials are taught and reviewed until they become a permanent part of the pupils' equipment for life.

Minnesota is fortunate in having a considerable number of enthusiastic geographers in positions of influence in the state. Prof. C. J. Posey is in the State University; Geogre J. Miller is at the Mankato Normal; Eugene Van Cleef is at the Duluth Normal; S. S. Visher is at the Moorehead Normal, and R. J. Scarborough at the Winona Normal. L. L. Everly who has been many years a teacher of geography is now one of the superintendents in St. Paul.

The newly elected officers of the Minnesota Council are C. J. Posey, president; L. L. Everly, vice president; Bessie P. Knight, secretary-treasurer.

Minnesota may be counted upon to do its part in the rejuvenation of geography.

MEETING OF THE KANSAS TEACHERS

The geography teachers of Kansas completed the organization of the State Council on November 10th at the annual meeting of the State Teachers Association of Topeka. Miss Jane Atwood, State Leader, had counted upon a meeting of about fifty teachers; between 200 and 300 crowded the room using all available standing room and a considerable number were turned away.

Miss Lucy McCoy read a paper on "Geography at the School of Education, Chicago, in the Summer of 1916," and R. H. Whitbeck spoke on the "New Movement in Geography." A constitution for the State Council was adopted and officers for the following year were elected. Miss Jane Atwood of the Emporia Normal was chosen president. Six directors, with terms of one, two, and three years, respectively, were elected; namely, Miss Jennie Williams and Supt. Senter for one year; Miss Eulalie Roseberry and Miss Bessie Bixby for two years; and Professor L. D. Wooster and John Lofty for three years.

The new Kansas organization started off vigorously as Kansas organizations have a habit of doing.

MEETING OF WISCONSIN TEACHERS AT MILWAUKEE

At the meeting of the Wisconsin Council a year ago, W. J. Sutherland was made president. His death soon afterward left the Council without a leader and the work which had been outlined for the year was halted. Miss Lilla Braband of Milwaukee, vice president, presided at the council meeting of Nov. 2nd. Several new members were admitted and it was definitely decided to increase the State Council to 40 or 50 members. R. H. Whitbeck of the State University was elected president for next year; Miss Lilla Braband, vice president, and E. G. Lange of the Whitewater Normal, secretary-treasurer.

At the Geography section of the State Teachers' Association, the program was largely devoted to papers and discussions on the Relation of General Science to Physical Geography in the High School. State Inspector Terry spoke in advocacy of General Science and Miss Sarah Dickie of Waukesha defended Physical Geography.

PROBLEMS FOR INDUSTRIAL GEOGRAPHY

1. Though Great Britain and Germany are old and, in many ways, more advanced than the United States, yet the manufactures of both together are less in value than those of the United States alone. Give reasons for this.

2. Give 5 to 10 reasons for the great development of manufacturing in the United States. Select the five reasons which you regard as the most important, and tell why you selected them.

3. While the United States produces twice as many manufactured goods *in value* as Great Britain does, it has more than twice the population of Great Britain and more than 30 times the area. Which of the two countries should be ranked first *as a manufacturing nation?* Give your reasons.

4. Both Russia and China are larger and more populous than the United States; both have great natural resources, in-

cluding coal and iron, and they have an invigorating climate; why are they not among the prominent manufacturing nations?

5. Account for the fact that prior to the present time the United States exported fewer manufactured goods than Great Britain.

6. What is a tariff? a protective tariff? Why called "protective"? How does a protective tariff help to build up a nation's manufacturing industries? Does such a tariff make goods more expensive to the consumer? Be prepared to defend your answer.

7. Cheap fuel is almost necessary in building up manufacturing industries, yet neither New England nor New York has coal deposits. Explain this apparent contradiction.

8. Suppose you desired to enter into some manufacturing enterprise on a large scale; in what part of the United States do you think you would locate—

(a) a meat-packing industry? (d) a cotton mill?
(b) a paper mill? (e) a steel making plant?
(c) a cane sugar refinery? (f) a silk mill?

Might there be several places equally advantageous for each of these? Explain. With respect to each of the above industries, name sections of the country where you certainly would *not* locate it. Give reasons.

9. The states of Ohio, Indiana, and Illinois, as a group, rank high in agriculture, in manufacturing, in mining, and in railway mileage. Give some of the reasons. Which one of the four is essential to the success of all the others?

10. Give reasons why the South has devoted less attention to manufacturing than the North. Why is manufacturing less developed in the West than in the East? Many people in the South do not desire mills and factories in their midst. Suggest reasons.

11. Suggest reasons for each of the following facts:

(a) Manufacturing has developed faster along the Great Lakes than along the Mississippi;

(b) on the shore of Lake Michigan than on the shore of Lake Huron;

(c) on the shore of Lake Erie than on the shore of Lake Ontario;

(d) along the Ohio than along the Missouri;

(e) on the Atlantic coast of the United States than on the Pacific coast;

(f) along the North Atlantic coast of the United States than along the South Atlantic coast.

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A REPORT OF BOSTON'S ATTEMPT TO ASCERTAIN RESULTS OF GEOGRAPHY TEACHING*

LAST year an effort was made to measure the educational results of some phases of the instruction in geography by giving a test to fourteen eighth grade classes in as many different schools, to four high school classes in four different schools, and to the eighty-six members of the first-year class in the Normal School. The test was prepared with a view of ascertaining:

(a) The character of the geographical knowledge of the pupils tested;

(b) The ability of the pupils tested to reason from geographical data;

(c) The relative adequacy of their knowledge of the general geographical features of the United States and Europe; and

(d) Whether scientific measurement of educational results in geography is possible.

Information on the above points is of value not only from the standpoint of measuring educational results, but it is particularly valuable at this time when a revision of the course of study is under way. It was desirable to find out, even if in a limited way, whether there is such a scattering of teaching effort in trying to follow the present course of study as to indicate the need of establishing a minimum requirement for each grade.

It is obvious that a forty-five minute test can cover only a limited field of geography. Therefore, the test was confined to the most important countries of the world, viz., the United States and the countries of Europe.

The preparation of a geography test, applicable to a number of schools working under widely different conditions, has been approached with full realization of the difficulties involved. Perhaps the greatest difficulty of all is that offered by the subject itself. The field covered by the geography of the elementary school, as at present defined in the course of study, is so broad that no school can be expected to cover it thoroughly. For this reason it was necessary to limit the questions to those phases of the subject concerning the value of which there would be little or no difference of opinion.

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*Abridged from School Document No. 14, 1915. Boston Public Schools. The investigation here reported was conducted under the supervision of Prof. L. O. Packard for the Boston Department of Educational Investigation and Measurement.

At the present time we consider that the value of geography lies not so much in a knowledge of facts concerning the earth and its people as in an understanding of the various ways in which man's activities are influenced by physical environment.

As a result of the study of geography in the elementary school the pupil should gain:

1. An abiding interest in the different peoples of the world, their industries, their achievements and their relations to ourselves.
2. A mastery of geographic facts and principles sufficient to enable him to explain:
   (a) The growth of the leading cities of a region.
   (b) The development of important industries.
   (c) The dependence of one part of the world upon another.
3. A breadth of mind which will lead to a sympathetic understanding of races and nations other than his own.
4. A working knowledge of the subject by a thorough training in the use of maps, texts and reference books so that he can work out new problems independently.

In short, geography should help the pupil to interpret his environment, which in the case of civilized man reaches out to all parts of the world.

The Questions in the Test

Below is given the two sets of questions used, following which each question will be discussed in detail. The detailed discussion will be limited to the results achieved by the eighth grade pupils.

Questions on United States

(An outline map of the United States was printed at the head of the questions).

1. Locate on the map the cities named at the right:
2. In the column marked "Products," write opposite the name of each city the name of a product for which the city is noted.

Cities	Products.
Minneapolis	....
Pittsburgh	....
Lowell	....
New Orleans	....
Duluth	....
Galveston	....
Lynn	....

3. Give reasons for the growth of Minneapolis.

4. Below is given a list of articles which we use in our homes. Write below each word the name of the state in which that article is produced in large quantities.
   cotton, oranges, cane sugar, rice, coal, iron
5. Write on the map the name of each state which you have just written in answering Question 4.
6. Why do the states just east of the Rocky Mountains receive less rain than Massachusetts?
7. Explain the way in which the flood plains of the Mississippi river have been formed.
8. Why are these flood plains good for agriculture?
9. Locate New York City on the map. Locate San Francisco on the map.
10. Give reasons why the commerce of San Francisco is not so important as that of New York City.

Question 1.—Locate on the map these cities: Minneapolis, Pittsburgh, Lowell, New Orleans, Duluth, Galveston and Lynn.

The reason for the selection of a question of this kind needs little explanation. All will agree that pupils should know definitely the location of the most important cities of every region studied. No city was included to which objection was offered either by a member of the Committee on Standards in Geography or by any of the persons to whom the test was submitted.

Examination of the tabulated results shows that 11.6 per cent of the pupils tested located all of the seven cities correctly. What is of more significance, 7.2 per cent could not correctly locate any one of the seven cities. With 71 per cent as a passing grade, 53.5 per cent of the pupils passed. These results show the necessity of selecting a comparatively short list of important cities which all pupils should know thoroughly. Clearly, it is better actually to know a few places than to get a smattering knowledge of many which is dissipated before the end of the year. After examining the course of study it would be well for each teacher to select an amount of locational work which she feels necessary and which at the same time she feels practically every one of her pupils can master.

Having made careful selection of important places, the teacher's next problem is to fix in the minds of pupils their location. This should be done as fully as possible by combining the study of location with other phases of the subject. For instance, in the study of industries pupils should locate on outline maps, cities, important lakes, mountains, rivers, areas of production, routes of transportation and manufacturing centers which are involved. Much, too, can be gained by requiring accurate location by pupils when wall maps are used. The teacher must take great care to see that other members of the class as well as the pupil pointing get correct ideas of places located.

Question 2.—In the column marked "Products," write opposite the name of each city the name of a product for which the city is noted.

Cities Products
Minneapolis ....
Pittsburgh ....
Lowell ....
New Orleans..................................
Duluth ....
Galveston ....
Lynn ....

In this question no city has been chosen which does not stand for at least one important product. There is little value in knowing the location of places to which no significance is attached.

The tabulated results show that 2.3 per cent were unable to associate a product with a single city named; 12.3 per cent gave correct products for all cities. The median amount of credit earned is 5.5. With 71 per cent as a passing grade, 62.8 per cent of the pupils passed.

It is interesting to note that the results for this question were somewhat better than for Question 1. In studying individual papers, however, it was evident that there was a close relation between the answers to the two questions. Very rarely did a pupil do well with one question and poorly with the other. Here is shown the great need of fixing in mind the location of places through the study of those facts which made the location of those places worth memorizing.

Question 3.—Give reasons for the growth of Minneapolis.

It is of some value to know the location of cities, and in case of the more important cities the products for which they are noted, but it is of greater importance for the pupil to be able to account for the development of a city in any given location. It is this latter phase of geography which makes a knowledge of the subject invaluable in that it enables the individual to explain the development and distribution of industries or occupations and thus leads to an understanding of conditions of life.

The results show that 43.6 per cent could give no reason for the growth of Minneapolis and 37.5 per cent could give but one reason, which is practically the median. With 75 per cent as a passing grade, only 2 per cent of the pupils passed.

Inability to explain the growth of one particular city may not necessarily indicate a serious lack of knowledge of the geography of a region, yet there is no doubt that after studying a region the pupils should be able to account for the development of its most important cities.

Question 4.—Below is given a list of articles which we use in our homes. Write below each word the name of the state in which that article is produced in large quantities.

cotton, oranges, cane sugar rice, coal, iron.

Question 5.—Write on the map the name of each state which you have just written in answering Question 4.

From the study of the geography of a country pupils should gain a knowledge of its chief producing regions. While some products are pretty generally distributed there are a few which are produced in larger quantities only in some one section of the country. Question 4 implies that a pupil should be able to associate products with those portions of the country which produce them in large quantities and should be able to locate the regions with a reasonable degree of accuracy.

Less than 1 per cent of the pupils failed to associate a single product with its proper state. Eleven per cent made all associations correctly. With a passing grade of 67, 63.2 per cent of the pupils passed Question 4 and 45.2 per cent passed Question 5. Pupils were better able to associate places and products than to locate places accurately. More serious than mere inability to locate producing regions was the failure to associate products and climatic belts. This was shown by pupils who located cotton and rice regions in the northern part of the United States.

Question 6.—Why do the states just east of the Rocky Mountains receive less rain than Massachusetts?

Question 6 requires that pupils have knowledge of the manner in which rainfall is affected by mountains and by distance from the sea.

With 50 per cent as the passing grade, 87.5 per cent of the pupils passed. Although there can be little doubt that these fundamental facts of climate are taught in all schools, yet 12 per cent of the pupils gave no acceptable statement and less than 10 per cent gave complete answers. Although pupils may never have been asked to compare these two regions before, knowledge of individual cases is of little value if it cannot be applied to new situations.

Questions 7 and 8.—Explain the way in which the flood plains of the Mississippi river have been formed. Why are these flood plains good for agriculture?

Knowledge of the formation of land forms is valuable in that such knowledge, as in the case of flood plains, explains in large measure the influence of the region upon activities. The fine soil, variety of material and level surface, all of which make a flood plain good for farming, are accounted for by its method of formation. With 80 per cent as the passing grade for Question 7, only one pupil in a hundred passed. With 75 per cent as the passing grade for Question 8, less than one pupil in a hundred passed.

Thirty-two per cent of the pupils were unable to give any explanation of the origin of the Mississippi flood plains and 15 per cent could give no reason why these plains are valuable for agriculture.

It was not to be expected that a large proportion of elementary school pupils would answer each of these questions fully, but it was thought that practically all pupils would give at least one acceptable fact in answer to each question.

Question 9.—Locate New York City on the map. Locate San Francisco on the map.

Question 9 involves simple location, as does Question 1. With 50 per cent as a passing grade, 88.9 per cent of the pupils passed. Although 72 per cent of the pupils located both cities correctly, yet it is astonishing to note that more than 11 per cent could locate neither New York City nor San Francisco.

Question 10.—Give reasons why the commerce of San Francisco is not so important as that of New York.

The importance of a commercial city, as is well known, depends largely upon three conditions: The character of the shore upon which the city is located; the character and accessibility of the interior which it serves, and upon its proximity to the shores of other commercial regions.

After studying the commercial cities of the leading countries, pupils should be able to sum up the conditions necessary to the development of such cities. Granting that such ability has been acquired, it should then be possible to apply these principles in explaining the advance of one commercial city over another. With 67 as the passing grade, 8.2 per cent of the pupils passed.

Practically 50 per cent could give no satisfactory answer to the question and but .3 per cent gave complete answers.

It was expected that the percentage of complete statements would be small but the number of total failures is surprising.

Questions on Europe

(An outline map of Europe was printed at the head of the questions.)

1. Locate on the map two seaports of European Russia.
2. Why are the seaports of Russia not so important as the seaports of England?

3. Of what value to the countries of Europe are their colonies in other parts of the world?
4. Why does England import large quantities of wheat?
5. Write on the map the names of the leading manufacturing countries of Europe.
6. Why has Germany become very important as a manufacturing country?
7. Why is the climate of Italy different from that of Germany?

With a passing grade of 50 per cent, 48.4 per cent of the pupils passed question 1. The table shows that more than 50 per cent were unable to locate either seaport and that only 19 per cent located both correctly.

With a passing grade of 75 per cent, only .3 of 1 per cent, i. e., three pupils in one thousand, passed question 2.

With 80 per cent as the passing grade, only .5 of 1 per cent, or five pupils in one thousand, passed question 3; 22 per cent could give no satisfactory answer and but .5 of 1 per cent made approximately complete answers.

With a passing grade of 67, only 8.6 per cent of the pupils passed question 4.

With 67 per cent as the passing grade, 72 per cent of the pupils passed question 5a and 73 per cent passed 5b.

With 75 per cent as the passing grade, 1 per cent of the pupils passed question 6; about 50 per cent could give no satisfactory answer and that but 10 per cent gave two or more acceptable statements.

With 75 per cent as the passing grade, only 1.9 per cent of the pupils passed question 7.

For the elementary school pupils taking the test on the United States the table shows:

1. That practically no pupil passed Question 8, indicating that it is probably outside the scope of the present geographical instruction.

2. That very few pupils passed Questions 3 and 10, probably to some extent at least for the same reason.

3. That from 45 to 63 per cent of the children passed Questions 1, 2, 4 and 5.

4. That in the case of only two questions (Nos. 6 and 9) did as many as 87 or 88 per cent of the pupils pass.

For the high and Normal School pupils taking the test on the United States the table shows:

1. That the questions which are difficult for the elementary school pupils are also difficult for the high and Normal School pupils and *vice versa*.

2. That in nine questions out of ten there were relatively

more elementary school pupils who passed than there were high school pupils.

3. That in six cases out of ten the first-year Normal School pupils did better than the high school pupils.

4. That there is not much difference between the results from the elementary school pupils and from the Normal School pupils.

The tabulation brings out the following facts:

1. That of the four questions on the United States most difficult for elementary school pupils (Nos. 7, 3, 8, and 10), three are classified as reasoning questions.

2. That of these four questions classified as reasoning questions only one was passed by a reasonable proportion of the pupils.

3. That there is no striking difference among the eighth grade, high school and Normal school pupils in their ability to reason about geographical data of the United States.

4. That what little difference there is, is in favor of the eighth grade pupils.

5. That with reference to Europe the high and Normal school pupils show a slight advantage over the elementary school pupils in the five reasoning questions.

From the above it is clear that in general the pupils succeeded in answering better the questions on location than they did the questions involving reasoning. Whether they answered the questions on reasoning as well as they ought to be expected to answer them is merely a matter of opinion.

Conclusion

1. Inability of pupils to answer satisfactorily several of the location questions seems to indicate too wide a distribution of effort on the part of teachers. The first step in the improvement of this condition is being taken through the definition of minimum essentials in geography. It is far better to teach thoroughly a few geographical facts than to spread instruction so thin that the results vanish in a short time.

2. The ability to associate with a place or product the geographical conditions which have made it possible should be expected of pupils. The test showed that pupils associated places and products better than they did products with climatic belts. This would seem to indicate that more emphasis should be placed on climatic conditions.

3. To what extent pupils can be trained to reason about geographical data is an unanswered question. They did not succeed in answering such questions as well as some expected they

would answer them. In this case, also, an attempt should be made to define to what extent and in what respects elementary school pupils should be expected to reason on geographical data.

4. The results from the first-year Normal School pupils are conclusive evidence of the wisdom of the action recently taken by the School Committee to provide a thorough course in geography in the Normal School for those preparing to be teachers. About six years elapse from the time the prospective teachers have a course in the geography of the United States until they enter the Normal School. Their knowledge of geography must be thoroughly reviewed if they are to be prepared adequately to teach that subject.

5. The results show how inadequate the customary examination or test in geography is to measure ability in geography. These results emphasize the need of standard tests for measuring ability in this subject.

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TROPICAL RAINS

Some years ago Woeikof made a detailed study of tropical rainfalls in which he brought out several important—and a few rather surprising—facts. For example, it appeared from Woeikof's investigation that general, moderate rains, lasting continuously for hours, and common in the "temperate zones", are known in many parts of the tropics and have ever been given special names there. Recently, Professor Oliver L. Fassig has made a study along somewhat the same lines, taking, for purposes of comparison, the island of Porto Rico and the State of Maryland. The special points in mind were the duration, frequency and intensity of the Porto Rican rains as compared with Maryland rains. It appears that tropical rains are of relatively short duration, by reason of the small number of cyclonic storms in the Tropics. Rains at San Juan last less than an hour, while at Baltimore the duration is eight hours. Tropical rains have a fairly uniform duration in all months. In higher altitudes, winter rains last longer than those of summer. On the other hand, the duration of "excessive rains" is greater in the Tropics, as is also their frequency. Excessive rains are more uniformly distributed through the year in the Tropics than in middle latitudes. The heaviest general rainfalls in Porto Rico are associated with West Indian hurricanes. The historic hurricane of Aug. 8, 1899, precipitated rainfall which has been calculated as equivalent to a weight of water of 1,113 tons per acre (*Mo. Wea. Rev.*, 1916, 329-337).

R. DEC. WARD.

THE COAL TRAFFIC OF THE GREAT LAKES

By E. L. Moran
Superior, Wis.

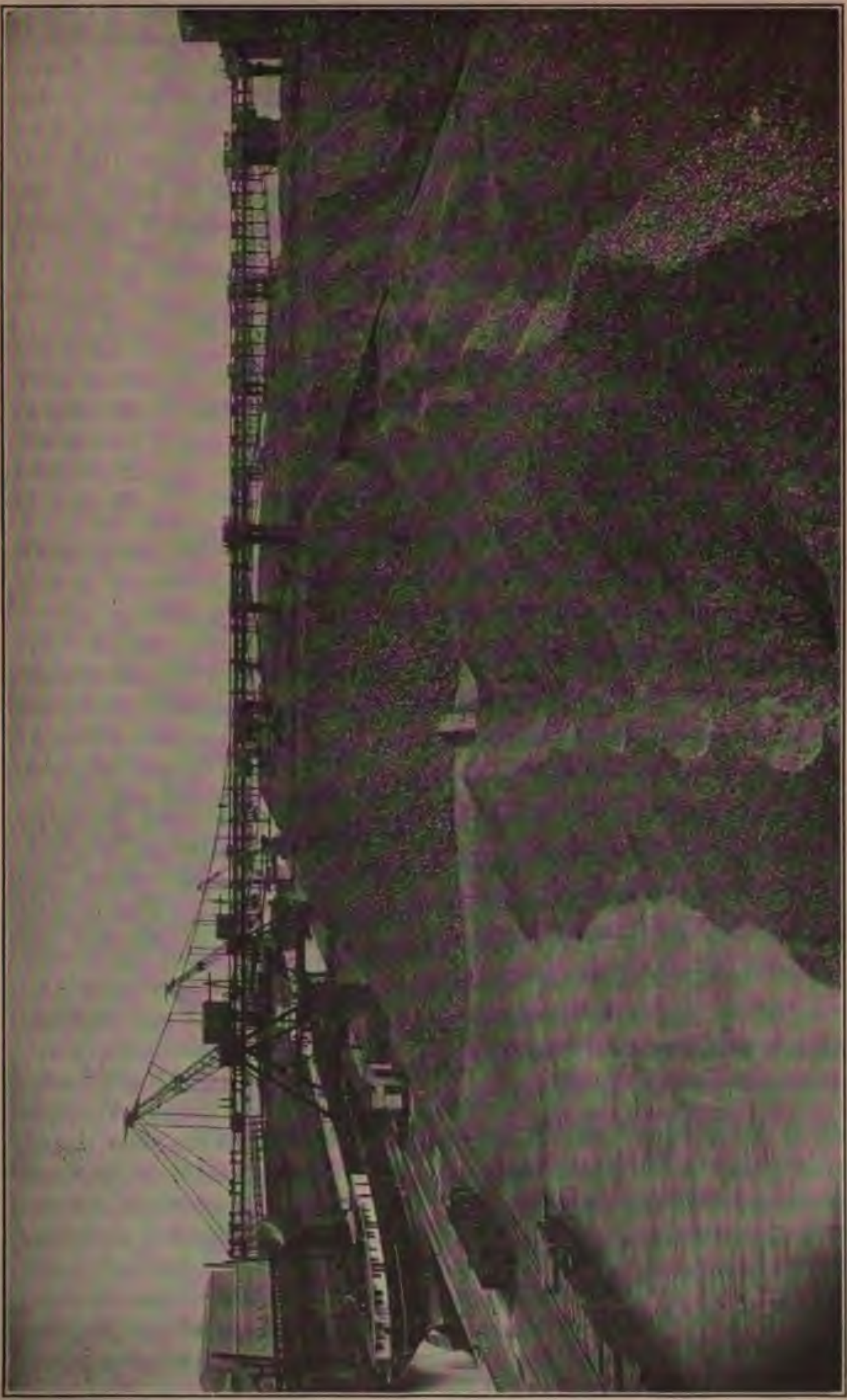
THE last touch in the completion of the North American continent was the creation of the Great Lakes, and they constitute one of its greatest physical features. These inland seas form the largest and most important interior waterway of the world. From Duluth and Superior, the extreme western ports of Lake Superior, to Ogdensburg, N. Y., the extreme eastern point of lake navigation in the United States, the distance traversed by the ordinary deep-draft vessels is 1,221 miles. A series of natural and artificial waterways connects these lakes with one another, and where there are differences in lake levels, locks have been constructed to permit interlake navigation.

The period of navigation averages a little over seven months. Although the lakes themselves are usually free from ice for a much longer time than this each year, the connecting rivers and straits do not ordinarily open up before April 15th, and they are frozen over by December 15th, forcing a suspension of all interlake traffic.

We have on these lakes an indefinite number of regular routes of transportation from one port to another, but the great bulk of the traffic movement follows several well defined trunk lines. The most important route is that from Lake Superior ports, through Lake Huron to ports on Lake Erie. The second route in importance is that from Lake Michigan ports to Lake Erie. Of all the commodities carried, the two greatest are iron-ore and coal. To the lake carriers, coal means west-bound cargoes. If it were not for this commodity, nearly all the vessels carrying ore and grain to the lower lake ports would be obliged to return light. At the present time coal constitutes about eighty-five per cent of the west-bound traffic through the St. Mary's Falls (Soo) Canals, and over three-fourths of all the west-bound traffic through the Detroit River. Shipments of coal through the Soo canals for the years 1911, 1912, and 1913 were as follows:

Year	*Anthracite*	*Bituminous*	*Total*
1911	2,060,209	13,272,667	15,332,876
1912	2,142,485	12,789,109	14,931,594
1913	2,744,574	15,878,364	18,622,938

Practically all of the coal traffic handled through this water route originates in the states of Pennsylvania, Ohio, and West Virginia. Other states in which soft coal is mined have strong



Coal Dock, Duluth, Minnesota. Storage capacity 1,000,000 tons; shipments from this dock aggregate two million tons per year.

rail competition to the western markets, and they find that there is no advantage in shipping by water. Hard coal, on the other hand, is all mined in a very limited district in eastern Pennsylvania and is, therefore, favorably situated in respect to the lake route. The following table showing the bituminous tonnages from the states above named, at intervals since 1901, all shipments destined for lake business only, gives an idea of the enormous tonnage transported and the rate at which it has been increasing:

Year	*Pa. tonnage*	*Ohio*	*W. Va.*	*Total*
1901	3,795,706	1,954,825	787,572	6,538,103
1905	7,443,883	2,062,692	2,109,262	11,615,837
1910	11,911,900	4,297,300	6,629,500	22,838,700
1911	10,911,900	4,019,544	7,171,200	21,782,685
1912	11,300,000	4,676,000	7,360,000	23,335,000
1913	13,415,473	6,176,624	8,736,586	28,328,683

Anthracite coal shipments by lake during the years 1906-1913 inclusive, were as follows:

Year	*Net Tons*	*Year*	*Net Tons*
1906	2,681,808	1910	3,639,368
1907	3,449,695	1911	3,917,419
1908	3,538,098	1912	4,204,741
1909	3,052,706	1913	5,033,696

The greater part of the above tonnage was carried from the mines to the lake ports by the Pennsylvania Railroad, the Baltimore and Ohio, Philadelphia and Reading, Lackawanna, Lehigh Valley, Erie, and New York Central systems. The coal is loaded usually in open, hopper-bottomed cars, of 100,000 lbs. capacity.

The principal shipping ports on Lake Erie are: Buffalo, Erie, Cleveland, Ashtabula, Lorain, Conneaut, Sandusky, Fairport, and Toledo; and on Lake Ontario: Charlotte, Great Sodus Bay, Little Sodus Bay, Oswego, and Ogdensburg, N. Y. At all of these ports there are special coal wharves, with modern appliances, for the transshipment of coal. Some of these harbors, from a navigator's point of view, are much better than others; but, as a rule, the water is of such depth and docking facilities are such that the largest vessels may be taken care of easily. The amount of coal handled at the Lake Ontario ports, however, is comparatively small, most of it being destined for nearby Canadian ports. The great bulk of the traffic moves through the

Lake Erie ports, and I give below bituminous shipments from the largest ports for the year 1913:

From Ashtabula	6,367,924 net tons
From Toledo	5,606,880 net tons
From Cleveland	5,151,824 net tons
From Sandusky	2,701,711 net tons
From Conneaut	1,929,512 net tons
From Huron	1,787,019 net tons
From Fairport	478,742 net tons
Total	24,033,612 net tons

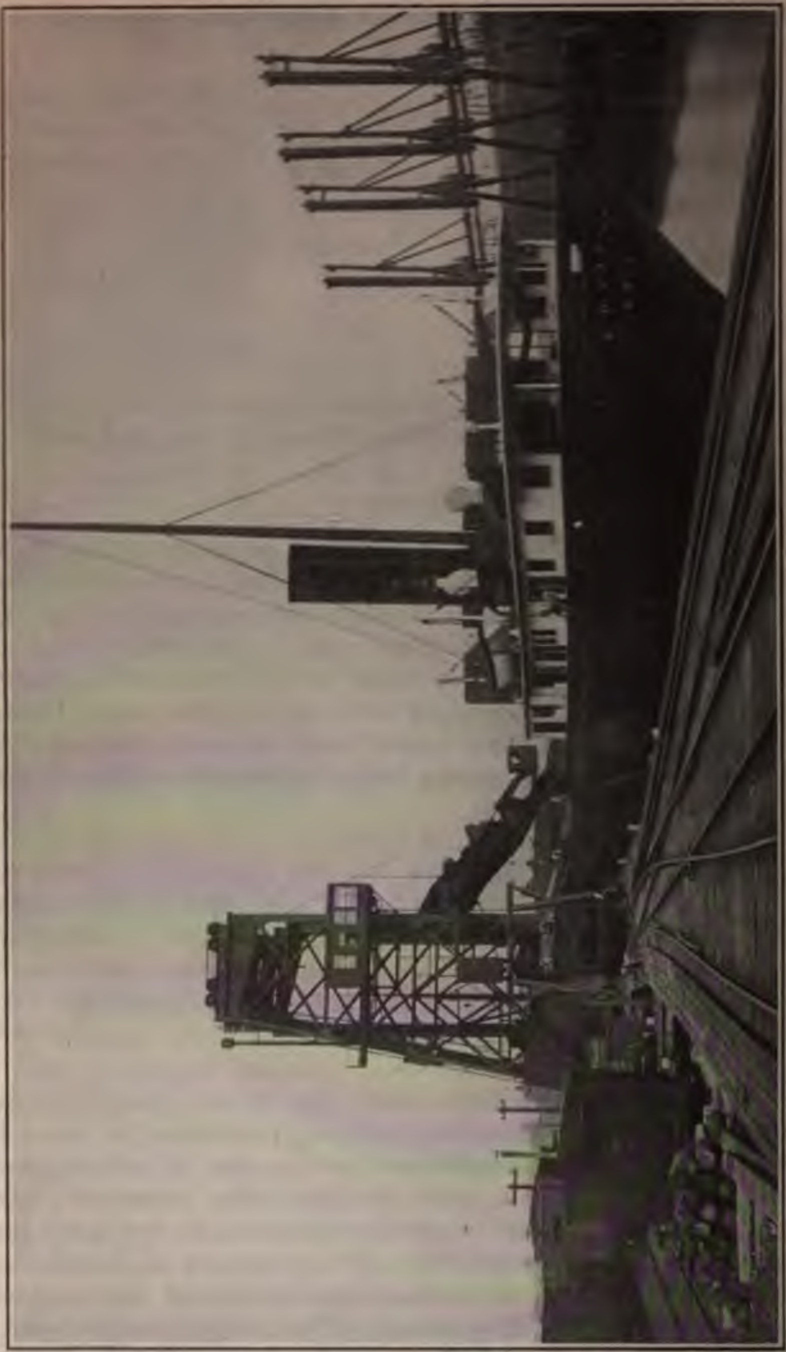
During the same year anthracite shipments from Buffalo exceeded 5,000,000 tons. But little soft coal is shipped from this port.

MODERN METHODS OF LOADING

Until very recent years the crudest methods existed in the loading of coal into vessels. Wonderful progress has been made lately, however, and no one need be surprised if, in the near future, coal is handled almost as expeditiously as iron-ore. But few improvements have been made in late years in loading anthracite coal; trestles equipped with pockets have long been in use, and vessels have been loaded with dispatch. Some of the largest carriers may be given a cargo from these trestles in three or four hours.

In the loading of soft coal, however, many innovations have been made. Until a few years ago soft coal was shoveled at a great cost from cars to buckets which were then swung onto the ship by derricks. Soft coal is difficult to handle. Lacking uniformity in size and often occuring in large masses, men found it very hard to shovel. Its physical texture also presented a serious problem; it could not be dropped any great distance without damage from breaking.

Because of the obstacles that had to be overcome, the primitive methods of handling soft coal persisted, but when the traffic assumed large proportions the expense of transshipment and the delays to vessels, made it so desirable to institute better methods that every effort was made to find them, and large sums of money were expended for this purpose. A satisfactory machine would have to attain high speed at a low cost, and with but a limited amount of breakage. These requirements seem to have been met by the car-dumping machines. In this type of loading machine the coal cars are run out upon the dock close to the side of the ship, and there clamped to the track of a mov-



Car Unloading Machine at Fairport, Ohio—Owned and operated by the Pittsburgh Coal Company. This machine picks up a steel car containing fifty tons of coal, elevates, empties, and returns it to the track in two minutes.

able platform. This platform and the car are then raised up and tilted bodily so as to deliver the coal with a minimum of fall into inclined chutes, which convey it to the vessel. The latest car-dumps, made by the McMyler Company, can handle over 1000 tons per hour; they are very economical to operate, and have reduced degradation to a minimum. Soft coal, of course, breaks up considerably more than anthracite, the breakage of the latter varying from 6 to 8 per cent. It needs scarcely be said that the value of coal is very much affected by this degradation, and constant efforts are being made to lower the above percentages.

Specialized Type of Boats

To transport such vast quantities of freight as are moved on these lakes, made up largely of heavy commodities such as ore, coal, and grain, ships of special and unique types have been evolved. Peculiar problems were presented to the navigator, but after years of experimentation they were solved, and a new ship produced which is better adapted to the requirements of the Lake service than any other would be. This new type is an extremely long and slender steel shell, of which an almost negligible portion in the stern and bow is taken up by engine and quarters. The long sweep of deck, clear of spars and superstructure, and pierced with hatches from one end to the other, admits of the utmost rapidity in taking and discharging cargoes.

Capacity of Boats

Since the building—in 1882—of the Anoka, the first steel freighter of the modern type, the plan of construction has remained substantially unchanged. The progress has been largely along the line of an attempt to surpass competitors in carrying capacity. To illustrate this increase in size a comparison is interesting. In 1890, the Matoa was the largest steamer on the Lakes, her average cargo being 2500 tons. By 1900 the carrying capacity of lake boats had leaped to 7000 tons, and four years later there was launched the Wolvin, a boat 560 ft. overall, with a capacity which enabled her, on her maiden trip, to transport 10,569 tons of coal from Buffalo to Milwaukee. In 1905 a number of vessels of about the same size as the Wolvin were built, some of which immediately proceeded to break all former records. The E. H. Gary, for instance, carried on one of her trips to Superior late that season 12,005 tons gross of coal.

In 1906 boats 600 ft. in length commenced to make their appearance, and carrying records were increased constantly. The DeGraff, in 1910, carried 13,333 gross tons from Ashtabu

South Chicago. The present record was made by the Steamer Schoonmaker in July, 1916, when she carried a cargo of 14,520 tons. This vessel is 617 ft. long, with a beam of 64 ft., and a depth of 33 ft. On a draft of 24 ft. the cargo capacities of these larger ships would be nearly 20,000 tons, but as the present channels in some of the connecting rivers afford a maximum depth of only 20 to 21 ft., their capacity is reduced below 15,000 tons. The normal economic speed of these giants is about twelve miles an hour on load draft, making their running time from Lake Erie ports to Milwaukee and Chicago approximately 60 hours, and to Duluth and Superior about 70 hours. In connection with this, it may be of interest to state that the fuel consumed by the entire lake marine during the short navigation season has been estimated at over 2,000,000 tons.

COAL RECEIVING PORTS

The principal coal receiving ports on the lakes are Superior, Duluth, Milwaukee, and Chicago. Although there are many very important smaller ports, such as Ashland, Green Bay, Manitowoc, and Sheboygan, the four ports first named receive the great bulk of the American tonnage. Their receipts during the calender years 1911, 1912, and 1913, were as follows:

Bituminous, Tons

	1911	1912	1913
Superior	1,734,003	4.515.185	5,532,856
Duluth	2,336,334	2,607,869	3,404,653
Chicago	560,093	831,579	934,898
Milwaukee	3,560,063	3.569.206	4,040,311

Anthracite, Tons

	1911	1912	1913
Superior	1,127,755	1.165,103	1,681.870
Duluth	236,813	296.882	363,286
Chicago	969,231	881,380	1,083,712
Milwaukee	1,005,750	952,117	1,148,920

To the above main harbors, it might be well to add the ports of Fort William and Port Arthur, which, as the extreme western Canadian ports are the chief distributing points for the Canadian Northwest. The receipts at these two places during the years 1911, 1912, and 1913, were as follows:

	1911	1912	1913
Fort William	1,941,404	1,448,142	2,086,537
Port Arthur	1,205,486	950,578	1,052,161

This tonnage represents a little more than half of the total receipts of all Canadian upper lake ports during these years.

Coal forms by far the largest item of receipts at Duluth and Superior, and the amount of capital invested in the large docks, with their extensive equipment, as well as the sums paid out yearly to the workmen employed, make the coal dock industry one of the most important at the Head of The Lakes. The coal handling machinery is of the most modern design, and the unloading capacities of almost every one of the twenty-nine docks at this point is above 5000 tons for 10 hours. Some docks even are able to take care of 16,000 tons in that time. It is a common occurrence for 10,000-ton boats to enter the harbor, discharge their cargoes of coal, reload with iron ore and depart within twenty-four hours. Because of this excellent dispatch, the wonderful harbor, and the ability of the carriers to always obtain return cargoes, the rate on coal to this port is 10c a ton less than to Milwaukee or Chicago. The tremendous growth of this traffic at Duluth and Superior since 1880, is indicated by the following record of receipts:

1880	60,000 tons
1890	1,780,000 tons
1900	2,672,577 tons
1910	8,171,644 tons
1913	10,991,669 tons

Bituminous coal forms about 85 per cent of the above.

Milwaukee is very favorably situated as a distributing point and has developed her harbor to such an extent that she is able to handle over five million tons of coal during the navigation season. Her docks have been increased in size and number until now she has a coal storage capacity of 2,500,000 tons. The most modern handling equipment is used and vessels are given very good dispatch. The coal-unloading facilities at Chicago, on the other hand, are inferior to those of the other important ports. The larger and more elaborate machinery, which has reduced the cost of handling coal to such a low figure, is not used extensively on the Chicago River. Only about one-fifth of the coal receipts of Chicago come by water, and the lake traffic seems to be unable to more than hold its own with the rail competition.

UNLOADING MACHINERY

As great advances have been made in unloading coal from vessels as in loading. In early days coal carried on the deck vessels was wheeled off to the dock in barrows, while that s in the holds was hoisted by means of horse power. As early as 1867, the steam engine was used in hoisting, thus affecting considerable improvement. However, as larger boats were built, new methods had to be devised, and many ingenious minds were set thinking as to how to work out improvements. The chief results of these efforts to obtain something better are the modern rigs of the Brown Hoisting Machinery Co., Mead-Morrison Co., Hyle-Patterson Co., and Wellman-Seaver-Morgan. All of these enormous machines are equipped with self-filling "clam shells", the capacities of which range from 5 to 12 tons, and hand labor has been almost entirely eliminated. Many docks are now electrically operated, and it is with wonderful rapidity that cargoes are unloaded.

CHEAPNESS OF LAKE TRANSPORTATION

In this lake traffic we are furnished with a conspicuous illustration of the cheapness of water transportation as compared with rail. Lake steamers normally take cargoes from Lake Erie ports to Duluth and Superior, a voyage of approximately 1000 miles, for 30c to 35c a ton. The consequence is that the great coal fields of Iowa, Illinois, and Indiana are practically shut out of a large portion of the Minnesota and Wisconsin markets, although much nearer than the Ohio, West Virginia, and Pennsylvania fields, which ship from Lake Erie ports. At the low rate of ½c per ton mile, it would cost $3.00 per ton to move coal from the Illinois and Indiana fields by rail even as far as Minneapolis, and it is not moved except at times of extreme scarcity. But if the railroads lose this large traffic, they benefit in another way. Being the largest users of coal, they store up for themselves huge supplies at the lake ports, and save money because of the cheapness of water transportation.

Then again, the water routes of the Great Lakes may be considered as a most valuable auxiliary to the railroads, for the vast majority of the freight handled on the Lakes must use them. It is either delivered to the port of shipment by the railroads, or it is received at the port of arrival for transportation to destination.

Freight sent by boats makes quicker time, as a general thing, than when forwarded by railroads. Particularly when it is considered that all-rail shipments would have to pass through Chicago and other crowded junction points, is it realized what a saving in time as well as in money is made by using the water route to the Northwest. In fact, it might be said that regardless of cost the enormous tonnage forwarded to that section could hardly be accomplished by the rail routes; certainly not as they are constituted at present, for to undertake to transport by rail anything like the quantity of coal now moving to the Head of the Lakes would paralyze the movement of merchandise over the railroad lines concerned.

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COTTON

By Adele R. Gavoille
Madison, Wis.

COTTON is one of the most valuable crops grown in the United States and is our largest single item of export. The latest statistics which can be called normal show that the total exports of domestic raw cotton and linters from the United States for the year ending June 30, 1914, were 9,500,000 bales—55 per cent of the total supply—valued at $610,475,000 and exports of cotton manufactures valued at $51,460,000.

The three leading cotton ports, from the standpoint of net receipts, were Galveston, New Orleans, and Savannah which together shipped about two-thirds of the total exports of raw cotton. Of the quantity exported nearly four-fifths went to three countries—the United Kingdom, Germany, and France. Among the other smaller purchasers of this American product were listed Italy, Spain, Belgium, Russia, the Netherlands, Japan, and Canada.

Of the total value of our exported cotton manufactures nearly three-fifths were cloth and one-fifth clothing and other wearing apparel. The leading countries importing these American products, according to rank, were the Philippines, China, the United Kingdom, Cuba, Haiti, Germany, and Mexico.

MANUFACTURING

Cotton has been used since the earliest times in the manufacture of textiles, but its use until after the invention of power-driven machinery for spinning and separating lint from seed was very limited. Of this machinery the cotton gin especially has played a preponderant part in the increased production and mill consumption of cotton during the last century.

In 1811 the world's estimated production of cotton was 1,100,000 bales. In 1914 the total was over 20,000,000 bales of 500 pounds each. In the increase in quantity of cotton consumed the United States leads the world, its increased consumption being greater than that of the United Kingdom and equivalent [illegible] of the whole continent of Europe.

In the growth of active spindles, also, the United States shows the largest increase, its number of 32,000,000 being double that of 1890. Of these spindles about eleven-twentieths are operated in the New England States, approximately two-fifths of them in the cotton-growing states, about one-sixteenth in all the other states. The greatest concentration of the industry is in Massachusetts which has more than one-third of all the cotton spindles of the country and consumes nearly one-fourth of the 5,500,000 bales, the total quantity consumed. It contains Fall River, the leading cotton manufacturing center, and the two counties—Bristol and Middlesex—which with Providence County in Rhode Island, have more than three-tenths of all the cotton spindles of the United States.

In the number of cotton spindles, South Carolina with about one-seventh of the total number ranks second, North Carolina third, Rhode Island fourth, Georgia fifth, New Hampshire sixth, and Connecticut seventh. Because of the greater ease in operating and because of the greater amount of fiber each ring spindle consumes, about seven-eighths of the spindles used in 1914 were of this kind while only about one-eighth were mule spindles.

Before the introduction of oil mills cotton seed was practically valueless, except for planting purposes. Now the crushing of the seed is an important part of the cotton industry. Statistics show that 870 establishments were engaged in the business during 1913; that in 1914 more than 4,750,000 tons were crushed; that the total value of the cotton seed products—the oil, an edible product, and the cake, excellent cattle feed—was $155,500,000.

IMPORTS

Practically all of the raw cotton consumed in the United States is produced in the country, but small quantities for special purposes are imported. The chief country from which our cotton imports come is Egypt, which furnished nearly one-half of the 280,000 bales imported in 1914. Other sources of our cotton imports are Mexico, which furnished one-third; China, Peru, and India.

Egyptian cotton is noted for the great strength of its long fiber. It is freer from trash and short fibers than American cotton and it consequently involves less waste in combing and carding. It is used here principally for mercerizing and for other processes that give a high finish to cloth, also in the manufacture of thread and other similar articles which require a long fiber of great strength and for which no other type of cotton, except sea-island, has proved suitable.

Peruvian cotton is mixed with wool in making woolen textiles, while Indian and Chinese cotton is to some extent mixed with the American upland in the manufacture of the cheaper grades of goods.

Besides raw cotton, this country imports cotton manufactures. The value of those imported into the country in 1914 was $69,400,000. Of these imports the United Kingdom, Germany, France, and Switzerland, in the order named, furnished the greater amount—96 per cent of the total.

Laces, edgings, embroideries, and the like formed about half of the total value of the imported cotton manufactures. Switzerland led in the furnishing of these. Germany furnished practically all of the knit goods, France about one-fifth of the cloth, and the United Kingdom three-fifths of the cloth.

TRAVEL BOOKLETS AS AN AID TO GEOGRAPHY

By Howden Harry Williams
Bureau of Education, Manila, P. I.

STUDENTS who do not care for geography may often become interested by the reading of travel literature. Every large railway in the United States has for free distribution beautiful booklets describing points of interest along its lines. Particularly is this true of the transcontinental lines and those of New England. The steamship lines on the Great Lakes and the river steamboats companies likewise issue folders of interest. In the outing periodicals may be found advertisements of various resorts, some of them in most out-of-the-way places, and all of them offering free booklets. This would not be money wasted for the advertisers, for the youthful readers may later prove to be among their best customers. The coast-wise lines issue folders that describe with interest the Panama Canal, and some of the fruit importing companies publish reading matter about nearly all of the West Indies and countries on the north coast of South America. Further advertising matter about South America is difficult to find, as the tide of tourist travel has only begun to turn that way since the beginning of the European War. A few copies of the Bulletin of the Pan-American Union, published at Washington at 25c per copy will stimulate more interest in Central and South America than all of the matter to be found in most geography texts.

Although the war has nearly stopped the tourist from going to Europe, the steamship and tourist agencies still have fo tribution many copies of the folders that they had before the war. These will cover nearly the whole of Europe, and a perusal of the advertisements found in Cook's Traveller's Gazette will show the addresses of hotels and firms in Norway, Greece and Spain that are anxious to have strangers visit those countries. The Swiss Government maintains in New York a bureau whose sole business is to supply folders and maps to those interested in Switzerland. The railways, both in England and on the Continent, send out free of charge, large quantities of maps and illustrated matter. Particularly the Midland Railway of London and the Furness Railway of Barrow have artistic folders that are of interest to the English as well as to the geography classes. The Paris-Lyons-Mediterranean Railway has booklets that could be sold for a good price if they did not bear the trademark of the Company.

The quantity of advertising matter relative to Asia is nearly as large. The railways of India send booklets advertising their lines. The largest are the Great Indian Peninsular and the East Indian, both of Calcutta. It will take about ten weeks to hear from them, but the result is worth the time. Cook's describe points of interest from Ceylon to Kashmir. They have branches at Rangoon, Hong Kong, Canton and the Philippines. Their Shanghai office has many folders of trips in China, including the Yangtze, Hankow, Peking, the Great Wall, and through Manchuria down to Korea. The International Sleeping Car Company, with offices in Yokohama, are agents for the Trans-Siberian Railway, from Vladivostok to Petrograd. About Japan there is a wealth of material, for the Japanese are good advertisers. The Welcome Society at Yokohama and the Imperial Government Railway at Tokio, have maps, guide-books and pictures, and they pay the postage. Their advertisements are as artistic as any made. And at Honolulu, the Hawaiian Promotion Committee, has a room in the Alexander Young Hotel, with a man whose sole business is to send out literature describing the beauties of the Hawaiian Islands.

Very little can be obtained about Africa, though the Cape Peninsula Publicity Association at Cape Town and the Boma Trading Company, Dewar House, Haymarket, London, S. W., have good booklets about South Africa and British East Africa. Again, Cook's at Cape Town have some interesting folders that take one from that city to the terminus of the railway near the Equator. In Australia the Immigration and Tourist Bureaus in any of the several capitals will send booklets describing all phases of the country. The Koninglik Paketvaart Matschaapij of Batavia, Java, has a large paper bound book in English that gives interesting information about all of the Dutch East Indies.

It is not necessary to give every company by name, for a little reading of the travel and outing magazines will give the teacher plenty of information. A postal will bring the desired material from nearly every one addressed. A postal with a one-cent stamp affixed, will bring a big envelope from a foreign country, oftentimes containing as many pictures as the whole geography text, and sometimes they are a good deal better. And the maps are good, too. At the outbreak of the present war, I had on hand a number of maps from the State Railways of Belgium, and we were enabled to follow the movements of the armies much better than we we could have done with an atlas, as the maps were on a much larger scale.

Now if the teacher has invested a dollar or so in this material, which will probably have resulted in an overworked postman and a big basket of mail, what shall be done with it? It can be used as supplementary reading, for the texts contain very meager information about certain regions. The folders are up-to-date and made to attract the possible visitor. They will do much for the student. The beautiful and interesting features are attractively presented and will keep the student's attention. Tours on paper may be taken, and the important topics discussed by the teacher, while a careful study of the excellent maps will be of great value. The pupil will see that many people are with good reason interested in regions other than his own. He will note the most attractive, and often the most important features of the countries he studies in this way, and later may go out into the world and see some of them for himself. This feature requires only a small outlay and is well worth the money invested.

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COALING AT NAGASAKI

By Walter N. Lacy
Foochow, China

NAGASAKI is said to be the cheapest coaling station in the world. Hence it is not surprising that the trans-Pacific liners make this a port of call on both east- and west-bound voyages, and load up with sufficient coal to supply their furnaces until they can again reach Nagasaki.

The harbor of Nagasaki is an excellent one. The ci
situated at the head of a bay on the southwestern side

island off Kyushu in southern Japan, and the deep bay is surrounded with high hills, and its two entrances guarded with small and rocky islands. The natural protection of the harbor, its spacious and navigable waters, and the abundance of coal found in the island, have all combined, naturally, to cause the Japanese to include this among the fortified districts of the islands. And the abundance of coal, the harbor advantages, and the cheap labor available, have combined to make this an attractive coaling station; and here vessels call for coal, even though they have no freight to be loaded or discharged, and even when an epidemic of cholera in the city makes it necessary to keep the ship quarantined from the shore while in the harbor and to have all the handlers of coal disinfected and clothed in new clothing before the ship could be approached and coaled.

One of the most interesting sights to be seen anywhere is this process of coaling a ship in the harbor of Nagasaki. No sooner does the ship drop anchor than she is surrounded by a fleet of coal barges, each carrying from 15 to 33 tons of soft coal. They line up along the vessel, fifteen or twenty on each side, with stern to the vessel. Up to each coal chute on the vessel's side is erected a series of small platforms, forming a series of steps from barge to chute, and all hung by ropes from the vessel's side. On these platforms men and women stand, one above the other, and others form a line connecting with the points on the barge where the coal is shovelled. As rapidly as cheap straw baskets (holding a little less than a half bushel, perhaps) can be filled with coal, these baskets are passed from one man or woman to the next until, after a journey of about five seconds, the coal is dumped into the chute on the vessel's side, and the empty basket is dropped onto the barge to be refilled. These baskets of coal are passed on an average rate of 38 per minute, the number reaching as high (in two instances recently observed) as 59 per minute; at this rate these men and women are able to unload a barge in about an hour, with a gang of twenty to thirty persons for each barge. As soon as one barge is emptied another takes its place, and the crew climbs over to the new barge and repeats its hard work for another hour. In this manner one of the largest ships on the Pacific recently loaded about 3500 tons of coal in six hours.

It is the abundance of coal, together with the economic conditions of crowded Japan (making labor cheap), which make possible this primitive, yet economical and interesting method of coaling ocean vessels.

THE TEA OF THE ORIENT

NO accurate figures of the world's total production of tea can be given, but the quantity in exchange between nations amounts annually to about 1,000,000,000 pounds, worth to the producers about $150,000,000, and costing the consumers over twice as much. China and Japan, by the average American, are considered the greatest tea producing countries, as most of our imports are from those countries, but so rapid has been the development of the tea industry of late years in British India and Ceylon that India now leads the world in tea exportation, with Ceylon crowding China for second place, and Japan in the fifth:

World's Annual Tea Exportations

1. India (1915-16)	338,470,262 pounds	37½% of total
2. China (1914)	199,439,733 pounds	22 % of total
3. Ceylon (1914)	193,583,592 pounds	21½% of total
4. Java (1914)	71,449,000 pounds	8 % of total
5. Japan* (1914)	69,657,712 pounds	7½% of total
6. Formosa* (1913)	29,783,812 pounds	3½% of total
Total	902,384,111 pounds	100 %

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*Total production.

In actual production China ranks easily first with an estimated consumption of five pounds per head of population:

Estimated Annual Tea Production in Millions of Pounds

1. China	1,710	70¼% of total
2. India	353	14½% of total
3. Ceylon	195	8 % of total
4. Java	73	3 % of total
5. Japan	70	3 % of total
6. Formosa	30	1¼% of total
	2,431	100 %

The per capita consumption among the different nations is estimated about as follows:

Australia	7	pounds per person
United Kingdom	6	pounds per person
China	5	pounds per person
Canada	4	pounds per person

Holland	1.75 pounds per person
United States	1.4 pounds per person
Russia	1.25 pounds per person

Tea is largely grown in China in family gardens for home use. Its origin seems to have been an attempt to make pleasant the habit of drinking boiled water, a necessity recognized long ago by a population living on a land in which sanitary conditions are greatly affected through density of population and primitive customs.

Chinese tea is grown chiefly in central China. It is usually picked three times a year, the first growth a light crop in early April, the second about the middle of May, and the third in August. The choicest first pickings are so highly prized at home that they are practically never exported; the later pickings are prepared for foreign consumption.

The difference between black and green tea is merely a matter of curing, although the two kinds are rarely grown in the same locality.

Tea requires fertile but well drained soil along with much moisture, a combination of conditions usually furnished best upon hillsides. This fact in combination with the large amount of labor required, makes it a crop admirably suited for Japan where the level land is largely given over to cultivation of rice and other grain crops.

About 650,000 acres are now under tea cultivation in India, four-fifths of this being in the northeastern part in eastern Bengal and Assam, a portion in northern Bengal and the rest in south India on the Nilgiri hills. The tea gardens are situated either on the hills or in the plains, and the distinction is not merely topographical for location has an important bearing on the finished product. The tea from the hill districts is of fine flavor but less is produced per acre than from the plains and the return is much less, in proportion.

Scientific management has evolved the following system of tea preparation: The tree or bush is kept down by pruning to a height of from four to six feet so that the leaves can be picked by hand. Small oil cells give the leaf its flavor and the stimulating quality comes from a substance called theine which much resembles the caffeine of coffee. The new growth of end leaves is plucked by hand and carried to the wilting houses where it is spread on wire screens in a well ventilated shelter. They are curled or rubbed by hand or in a rotary machine and the wet curled leaves are then spread to a depth of three inches on concrete floors in darkened cellars and a process of fermentation takes place which is to give the tea a certain color and a certain flavor. When the desired point is reached the leaves are placed in ovens and dried, then sifted, selected, sorted and finally boxed for shipment by boat or rail to the central markets of Calcutta and sold locally or for export.

Ceylon, with its more humid climate, perhaps furnishes the best tea growing region of the world, and a production of as much as 1000 pounds per acre has been reached there, plucking being possible every two weeks throughout the year. The growth of the industry has been remarkable. In 1867 there were 10 acres of tea, and in 1915, 403,000. The Ceylonese method of tea growing is typical of the most successful method of prosecuting tropical industries. More than half of the plantations are owned by corporations and practically all are managed by English superintendents. The average plantation is 300 acres as against a fraction of an acre in China. The work is done by coolies, men, women, and children, many of them families from Southern India who return to their homes across the straits after a period of work gives them a little money. The intensity of the tea industry is shown by the fact that about 600 square miles of tea plantation employs about 400,000 coolies or about one to the acre.—[Excerpted from *Commercial America.*]

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TIME ALLOTMENT FOR GEOGRAPHY IN DIFFERENT CITIES

(Compiled by the St. Louis Committee, 1915)

	Grade—I	II	III	IV	V	VI	VII	VIII	Total
			Number of Recitation Periods						
Boston				150	150	150	150	90	690
Worcester			60	80	120	125	135	135	665
Cincinnati			80	140	140	100	100	80	660
Rochester			67	167	107	167	77		644
Jersey City.....	20		80	100	165		135	130	630
Syracuse			100	150	150	130			580
Tacoma	25	25	25	105	87	200	75		542
Chicago				75	150	125	100	60	510
New York......				135	120	120	120		495
Pittsburgh					120	120	150	100	490
St. Louis.......			67	80	80	80	60		3

PLANNING A COURSE IN GEOGRAPHY

Questions considered by the Nebraska Committee.

1. What phases of Nebraska environment and life should we have prominently in mind, in selecting geography material for a state course of study?

2. Would it be advisable to plan for variations in the course of study adapted to different regions in the state? Or, should an entirely uniform course be planned for an area as large as our state?

3. What should be the basis of determining whether material is geographic or not?

4. Shall we assume that the majority of teachers using this course of study are untrained—that is—shall we attempt a self-teaching outline?

5. What interests of children should be considered in selecting geography material?

6. How should the child's stages of development affect the choice and presentation of geography material?

7. What should home geography include? In view of the fact that the content of home geography must vary greatly with locality, how can a practical working outline be prepared?

8. Should we handle regional studies by means of the discovery and solution of problems?

9. Should this course include the statement of some type problems?

10. When should the facts of mathematical geography be presented? Should these be presented as general geographic principles or should they be introduced in connection with the solution of regional problems?

11. When should the important facts of physical geography be presented? Should these be presented as facts in themselves, or in connection with regional problems?

12. Do you approve of the usual plan of covering the field twice in the course?

13. Should separate courses be planned for town and rural schools?

14. In what year should formal geography begin?

15. Should geography as a regular subject of study be dropped at the end of the 7th year?

16. How should the "where" element in geography be handled? In what grades should it be stressed?

TO OUR SUBSCRIBERS

The growth of the subscription list of the Journal has been notable during the past two or three months, and we have not been able in all cases to begin a subscription with the number requested by the subscriber. As long as we had the magazines we began subscriptions with the September or October number whenever requested to do so. We did the same with the November number as long as the supply lasted, but doubtless some people were not able to get the back numbers.

Will subscribers please note the following plan which is being followed by the present circulation manager with reference to discontinuances; a renewal blank is enclosed in the magazine of the month in which the subscription expires. Even if no renewal is received during that month the Journal is sent the following month to the subscriber, and a "final notice" slip is enclosed in the magazine notifying the subscriber that if a renewal is not received during the month the magazine will be discontinued. It is believed that two notices will suffice to prevent any subscriber's having his magazine discontinued against his wishes. We are exceedingly anxious to retain our subscribers, but the very narrow margin upon which the magazine is conducted makes it impossible to send the magazine to a large number of people whose subscriptions have expired and who have not signified their wishes for the future. The new circulation manager is not sending out bills as has been the practice in the past, believing that the two notices enclosed in the magazine are sufficient.

We greatly appreciate the assistance of the people who have recommended the Journal to their friends, and by whose aid our circulation has had a healthy growth. We also appreciate very much the hearty endorsement which has been given to the Journal by leaders of the state councils in different parts of the country, and particularly by the leaders of the National Council of Geography Teachers.

The increase in our subscription list apparently is coming more than ever before from teachers in the grade schools. We shall, therefore, give more attention than before to the publication of articles and items designed especially for them.

We invite any of our subscribers to become contributors to the columns of the magaine. Of course, we cannot promise in advance to use all material that is submitted, but we shall be glad to use that which is suited to the needs of the Journal. We especially invite the sending in of news items or brief geogr cal notes which will be of interest to other teachers.

NEWS NOTES

MEETING OF THE MASSACHUSETTS BRANCH OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

On December 2nd, in the lecture room of the Boston Public Library, the Massachusetts Branch of the National Council was formally organized, and over 100 persons became members. Sixty-five of those persons, who had not already joined the National Council, did so at that time. The officers of the Executive Committee of the Massachusetts Branch are:

Mr. L. O. Packard, Chairman
Miss Nellie B. Allen
Mr. Sumner W. Cushing
Miss Elizabeth Fisher
Mr. Arthur L. Gould
Mr. Charles P. Sinnott
Mr. W. W. Atwood, Secretary and Treasurer

The program for this opening meeting was as follows:

"Geography in the Junior High School"—Professor Ray Hughes Whitbeck, of the University of Wisconsin; Editor of the Journal of Geography.

"The Racial Factor in the Development of South America"—Professor Walter S. Tower, of the University of Chicago.

"The Teaching of Geography in Elementary Schools"—Mr. Charles P. Sinnott, of the Bridgewater Normal School and the Hyannis Summer School.

These papers were thrown open to discussion, and there was active participation by a number who wished to express their appreciation of the material presented by the speakers, and their enthusiasm over the promotion of the work undertaken by the National Council. Running through the entire discussion from the floor there was a strong sentiment that geography work must not be omitted from the curricula of the upper grades or junior high schools. The larger, deeper meanings of geography cannot be grasped by the children in the 6th grade. The significance of geographic factors upon history, upon international relationships, upon racial development, the larger concepts of the climates of the world, of mathematical geography, and of physical geography, will be lost in the educational system that closes its work in geography too early.

The Executive Committee proposes to hold several meetings throughout the state during the present school year. Special programs will be prepared for these meetings, and further opportunities offered for teachers to join the organization. The hope and ambition of the officers is that geography will appear as a special topic for consideration at each of the state and county meetings from now on. Special committees have been appointed to attend to these matters.

(Signed) Wallace W. Atwood,
Secretary and Treasurer. Harvard University.

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RECENT PUBLICATIONS

Francisco the Filipino. By Burtis M. Little. 104 pp. Illustrated. American Book Co. 1915.

A charming and instructive story which illustrates the life and customs of the Filipinos. The author has spent two years in the islands and is very familiar with the life of the people. He is to be commended for having written an instructive book for boys and girls and at the same time not fallen into the stilted phrases common to writers for young people. F. E. W.

Economic Geology. By Heinrich Ries. John Wiley & Sons, New York, 1916. 827 pp., $4.00.

Ries's Economic Geology is a valuable book for teachers of commercial geography to have personally and to place on the high school or normal school reference shelf in order that their students may look up mineral resources for special topic work. The book devotes 137 pages to fuels—coal, petroleum, and natural gas; 138 pages to construction materials—iron, building stones, cement, and clay products; 24 pages to fertilizers; 10 pages to underground waters; and an adequate space to the precious and other metals, to abrasives, etc.

The origin of each of the ore deposits and non-metals is discussed adequately, distribution is well shown on an extensive series of outline maps, and the references to other books and papers is unusually complete. The photographs and cross-sections would make excellent lantern slides, many of the former being taken by the author, who described most of the mineral resources from personal knowledge, based upon his long experience as teacher and investigator. Lawrence Martin.

An Industrial Geography of Britain. By the same author and publisher as above. 143 pp. 10 pence. 1915.

The author says of his little book, "Perhaps a better title would have been, 'Nature's Gifts to Britain.'" The book is an effort to show the influence of the physical features of Britain upon her industrial development and is intended to accomp
the author's Industrial History of Great Britain.

The Geographical Review

the monthly magazine of the American Geographical Society, is a periodical of unique interest to teachers of geography. The special articles, of which four or five appear in each issue, are written by authorities in the various branches of geographical science. The illustrations are of the highest order, and the maps, hand-drawn and occasionally in color, are unsurpassed. Some of the articles that will appear in 1917 are:

A Vegetation Map of the United States
By Forrest Shreve, Desert Botanical Laboratory

A Pilgrimage in Northeastern Africa
By Prof. William H. Hobbs, University of Michigan

The Eskimos of Northern Canada
By Diamond Jenness, Ethnologist of the Stefansson Arctic Expedition

Short items of topical interest constitute a monthly geographical record. Concise in form and of current importance, they are directly useful in the classroom. The section of the *Review* entitled "Geographical Publications" is indispensable to those wishing to keep pace with geographical progress. It is an annotated bibliography arranged under a regional classification. It includes practically every new book and article of direct or indirect geographical bearing.

The yearly subscription for the *Review* is $5.00; single copies are 50 cents each.

The American Geographical Society has also inaugurated a series of books, of which at least one will be published annually. The first of the series is "The Andes of Southern Peru," by Dr. Isaiah Bowman, Director of the Society. The second, now in press, is "The Frontiers of Language and Nationality in Europe," by Leon Dominian.

The magazine and the annual monograph free of charge are among the privileges enjoyed by Fellows of the Society. Teachers and others interested in geographical affairs are invited to become Fellows. The annual dues are $10. Full particulars regarding Fellowship will be sent on request.

THE AMERICAN GEOGRAPHICAL SOCIETY

BROADWAY AT 156th STREET, NEW YORK

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MINIMUM ESSENTIALS IN ELEMENTARY GEOGRAPHY

By Bessie P. Knight
Minneapolis Public Schools

PROFESSOR Dewey has said that geography and history are the two bodies of intellectual material that most fully reveal the life of society as a whole; that the aim in developing a topic in geography should be to picture life responses and to cultivate in the pupil that attitude of mind in which he is on the alert for geographical causes.

Professor Salisbury, of Chicago, has said that "geography is an interpretation of the earth's surface and climate and the relations of life to them," that geography is best adapted to preparation for life in general because it deals with common things,—land, water, air, plants, animals and human beings,—with the every day facts of life.

The primary object of geography is not teaching geography but teaching the pupil. This education consists of the ability to think and talk straight, to say just what one means. Geographic study should develop in the pupil a sympathetic appreciation of the surroundings in which he lives, give him power to interpret his environment in an elementary but fundamental way.

In the presentation of a lesson, understanding should precede memorizing. The out-of-doors is an excellent place to study. Lead the pupil to see the things around him. Whenever possible let our study be first hand. Give problems. It will be more difficult to cover the work laid down in the course of study but much of that isn't important, anyway. The older pupils ought to be given problems to solve rather than facts to learn. This gives them the delight of finding out things for themselves—the consciousness of the power of connected thinking.

The Detroit Course of Study states that in the study of geography there are two things to understand,—maps and the relations between natural controls and life; and that in the sch
room this study is carried on by drilling, by gathering mat

on topics, and by solving problems. In order to accomplish this end the pupil should,—

1. visualize maps and locate the points listed under "Minimum Essentials"
2. gather geographical material
3. organize geographical material
4. acquire general information
5. discover problems
6. solve problems
7. study pictures
8. read books of travel and articles in magazines and geographical material in newspapers
9. observe geographical phenomena in the neighborhood
10. cooperate with others by making reports to the class or by serving on committees to investigate and report.

The Detroit committee holds that the study of cause and effect is the heart of the study of geography, but that many facts must be learned whose causal relations to environment are not fully understood.

The Indianapolis course gives the following aims for geography teaching:

"1. To give the child a definite knowledge of the location and character of certain important places or regions on the surface of the earth,—information which every intelligent person should have at his command.

2. To lead the child to see that the earth is adapted to man's habitation and therefore fitted by a wise Creator to be man's home.

3. To show the interdependence of man."

This course further states that "to attain the foregoing objects it is necessary to cultivate the child's powers of observation, reason and imagination. Geography, then, is not only a description of the earth's surface but a study of the people who inhabit it, and their life as affected by physical environment. The study should possess a human interest, showing the earth as the home of mankind and its adaptation to man's activities. The work in the primary grades should stress training in observation; in the fourth and fifth grades should reach beyond the immediate environment and be made vivid, developing the imagination; and in the sixth, seventh, and eighth grades the child should be ready to do independent thinking, basing his reasoning upon his knowledge of facts learned."

Geography should teach the present, not the past, and aid in the proper adjustment of the pupil to his surroundings and life.

What we need most is the proper geographical spirit rather than a fixed method. It is frequently said that the difficulty in geography teaching arises from the fact that many teachers do not know geography—that geography classes are often left to the one who has nothing else to do. Geography is a professional subject and requires professionally trained teachers.

THE CALL FOR A LIST OF MINIMUM ESSENTIALS

In this time of standardization, measurement, and efficiency tests, it behooves us to see where we are and ought to be, and whither we are going. Out of the demand for definite, fundamental results, and for ability to measure up to present day standards, has come the demand for the adoption of minimum essentials.

Minimum essentials, as I understand the term, are a set of fundamental geographic facts which are necessary to the child's future progress in geography and essential to intelligent citizenship.

A list of minimum essentials is in no particular a course of study and should not be considered as such. It is not a method of procedure nor a syllabus of underlying principles. Neither is it a summary of the aims of geographic teaching with their application to a course of study. A list of minimum essentials is a group of fundamental, elementary facts essential to the child in his relation to the world with which he has to do. The best summary of essentials of which I know is included in an article in the Journal of Geography, Vol. 4, 1905, by Mr. R. H. Whitbeck. It is as follows:

> "Given an unlettered map of the United States, on which the states are outlined, our grammar school graduate ought to be able to write the names of the states in their proper places. He ought to be able to do as much for the important divisions of South America, Europe, Asia, and Africa.
>
> "He should know the approximate location of the eight or ten best known rivers of the Mississippi system; three or four of the Pacific rivers; and two or three of Canada; the three great river systems of South America, four or five of Africa, a half dozen of Asia, two or three of the British Isles, of France, of Germany, and of Russia; also the Po and Danube. He should, of course, know the rivers of the region in which he lives.
>
> "He should know the location of such arms of the ocean as are highways of the world's great commercial movements.
>
> "He should know the location of those islands and groups of islands that are real factors in the world's activities, or have a great historical interest.
>
> "He should know the facts of position, direction of trend, etc., of the half dozen most important mountain systems or mountain groups of North America; the Andes, Apennines, Pyrenees, Caucasus, Ural, Himalaya, and Altai; the location of a few of the most frequently mentioned peaks, such as Mt. Blanc and Mt. Everest.
>
> "There are a few capes that are often mentioned, such as Horn, and G Hope, and their location is worth knowing.
>
> "He ought to know something of the location of the chief colonies Great Britain, France, Germany, Holland and the United States.

> "He ought to know something of the location of some twenty-five of the chief cities of the United States, what those cities stand for in our industrial and commercial life, and the advantages of their situation. There are twenty or thirty foreign cities whose location should be definitely known, and also something of what these cities stand for. In addition to these there are fifty or more cities at home and abroad whose names ought to be familiar to the pupil. It is sufficient to know in what state or nation these are located."

The Detroit Course of Study in Geography of September, 1915, gives for grades 3 to 6 inclusive minimum essentials in location which include practically the same material as that given by Mr. Whitbeck, referred to above.

The list made out last spring by a committee of the Minneapolis Geographic Society covers practically the same work as the Detroit Course but includes causal and problem work in the seventh grade. We have found, however, that it needs revision, being in places neither elementary nor fundamental.

LOCATIONAL GEOGRAPHY

Many criticisms have been made regarding the emphasis placed on the study of location. Mr. G. J. Miller said at a Round Table Conference of the M. E. A. in 1914, "Much of our geography is still place geography. I do not mean to imply that place geography is unimportant. It probably constitutes a very large proportion of the material that the student will use in after life and is therefore of vital importance."

If we could have a complete understanding of what location should include, perhaps this would aid in eliminating the objections to it. Location means far more than finding a place on a political map. Location is largely a matter of physical geography,—a response to certain physical conditions,—therefore let us use physical maps and consider locational relations of rainfall, winds, and heat belts as well as of latitude and longitude, and always show the relation to the home land. Location should include the ability to state accurately these relations. Above all let us not neglect to establish in the mind of every pupil a definite sense of direction.

VALUE OF DRILL

Let us not speak of drill in low tones. Drill is essential and all our work would show greater efficiency if we drilled on essentials more conscientiously. The necessity for drill in the location of places of common interest is as essential as drill on the fundamentals in Arithmetic. The past summer I heard a university student locate Saskatchewan in Asia. Another student who had visited Havana knew it is located on the south coast of Cuba. How often we hear complaints from business men that our school graduates do not know the locations of the most important cities of the United States and cannot find a city address when directed. Should not these complaints be considered in the adoption of minimum essentials?

The shortening of the time given to geography in elementary schools has led to the necessity for definite, fundamental, concise work—something which will give the best education possible in the limited time. A general movement in all branches of education toward a standard of measurement of efficiency has also led to this demand. The consciousness of the failure of our work to meet the needs of everyday life has awakened us to the need for revision. Our work must be made more constructive and fundamental through careful selection and elimination.

Needs of the Present

Many difficulties are met with in attempting to establish and use effectively a set of minimum essentials. Much time and thought are required in the selection of such a list. To do the work, a number of people who are thoroughly familiar with all phases of elementary geography and who are willing to give abundance of time and study to it is necessary.

It is essential to have school officials who will aid in the selection of thoroughly competent teachers to form a committee to aid in keeping us in touch with the most advanced geographic thought and to change the course of study and the essentials to meet the changing requirements of the times. There must be by all concerned a thorough understanding of the relation between minimum essentials and the course of study.

There must be adequate material for carrying out the plans made. Prof. Bobbitt, of Chicago, in his report on the Cleveland Survey says, "In our teaching of geography everywhere it must become more humanized and socialized and should be given much more time in the last two grammar grades. It must consist of stimulating and guiding children toward intelligent inquisitiveness and inquiring interest as to the world, the skies above and waters round about and the conditions of nature that limit and shape the development of mankind. As in reading, so in geography, right development of the course of study must depend in large measure upon the material equipment that is at the same time provided. It sounds like legitimate evasion to say that education is a spiritual process, and that good teachers and willing, obedient and industrious pupils are about all that is required. As a matter of fact, just as modern business has found it necessary to install one-hundred-dollar typewriters to take the place of the penny quill pens, so must education, to be effective, develop and employ the elaborate tools needed by new and complex modern conditions, and set aside the tools that were adequate in a simpler age. The proper teaching of geography requires an abundance of reading materials of the type that will permit pupils to enter vividly into the varied experiences of all classes of people in all parts of the world. The schools need ten times as much geographical reading as that now found in the best equipped school."

There should be a careful study and selection of texts and maps. The lack of adequate and dependable maps in our school geographies has been a handicap to the best geographic instruction. Fortunately some really excellent texts and maps, reliable and scientific, are becoming available. Our task is to get a voice in the selection of texts and maps, and let us call to our aid in this selection the people who know. When we get a good map let us use it,—teaching its use, interpretation, and accurate reading.

Another stumbling block in our work has been the so-called part geographies. Why any public school in this great country should be required to use a text which does not contain a map of North America and United States is beyond my comprehension. What is our basis of comparison to be without our home land? Pupils may be able to visualize quite accurately a map of United States, but not sufficiently well to serve as a basis for comparison in all work. When we are studying the British Empire, these part books do not contain a map of Canada or any text work on it. Economy! Yes, but of what and to what end? We must have complete texts if we are to teach problems and responses. No part of the world today which is worth studying at all, is so isolated as to be studied apart from the rest. If we must economize and use these part books let us at least insist upon a complete set of maps of the continents and of the United States in every text.

How shall we drill upon essentials in location without maps in our texts or up-to-date wall maps? We are given political maps whose divisions are constantly changing. Let us ask for physical wall maps. Diastrophism and erosion have not and will not change the surface features sufficiently in fifty years to make these maps out of date. Vegetation, climatic, and rainfall maps will not change greatly in a period of twelve or fifteen years. Industrial and commercial maps will necessarily change somewhat more.

Fortunately our current magazines, especially the National Geographic, and the railroad companies furnish us with up-to-date maps free or at a nominal price and the Government will supply us with excellent maps of the United States at small cost.

CONCLUSION

Whatever we teach or don't teach, whether location, cause or effect, let us attempt at least to give a fair and honest understanding of the countries studied; show something about what each country contributes to the rest. If the countries of Europe had really understood each other perhaps the present war need not have been. Let us learn to be considerate of each other's wants,—to develop an understanding of the tastes, needs, industries and prejudices of each people in order to be sympathetic and helpful.

And above all let us remember that a study of our own history and country leads to good citizenship—to an ambition for things that are right and to an appreciation and love of our own United States.

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THE WOOD PULP INDUSTRY

By C. T. ANDERSON
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PAPER for magazines, periodicals, newspapers, wrapping purposes, and numerous other things, is one of the most widely used articles in civilized countries; of these the United States is the greatest consumer. Since many plants contain fibres, the fibre used for paper-making is in a large measure determined by its relative quality and cheapness. In the early stages of the development of paper-manufacturing, rags were used, and the mills gathered around the centers of population. A little later the fibre of a grass known as *esparto* was found to be suitable for paper. The grass flourishes on sandy soil in semi-arid regions; northern Africa and Spain had a large export trade in this grass. But still later wood pulp was introduced. Because the large areas of forest in nearly every country made the wood fibre relatively cheap, paper made from wood pulp increased rapidly and in 1901 far exceeded all other kinds combined. With the change from rags and *esparto* to wood fibre, factories have ceased to be built in the cities, and are now mostly located near the wood supplies. At the present time, according to the latest census report available, over 60% of the waterpower utilized in the United States is used in paper mills, so close is the relationship between pulp manufacture and waterpower.

SUITABLE WOODS FOR PAPER PULP

Although at first the spruce was the only wood used for the manufacture of pulp, twenty varieties are now used. The wood classified and arranged according to their relative consumption, are: spruce, hemlock, poplar, balsam fir, pine, beech, maple, white fir, cottonwood, chestnut, douglas fir, tamarack, elm, basswood, birch, ash, and cucumber. The latest wood to be added to this list has been recently discovered by a Swedish expert in the Argentine. The name of this species is the *Araucaria Imbricala;* it covers over 2,470,000 acres in the one district of Neuquen; it is reported to be more suitable for pulp than any of the woods now used in either America or Europe.

THE AREAS OF PRODUCTION

The United States is not only the largest consumer of paper, but it is also the greatest manufacturer of wood pulp. Despite the fact that large quantities of timber have been cut from the forests, the United States still has the greatest forest reserve in the world, including nearly all of the woods suitable for pulp manufacturing. The trees which are too small for timber make excellent pulpwood, so that the entire supply may be utilized. The Lake States, including Wisconsin, Minnesota, and Michigan, have extensive areas of hemlock, balsam fir, maple, chestnut, poplar, jack pine, tamarack, and ash. At the present time very little is imported by these states from Canada. The Eastern States, including the New England States, New York, and Pennsylvania, also have large supplies of spruce, poplar, pine, balsam fir, and hemlock. All of the pulp wood imported into the United States comes from Canada; imported spruce and poplar together forming 23.1% of the total consumed in 1910, and in 1911 imported wood formed 21.7% of the total. In 1914 the United States imported from Canada 972,508 cords valued at $6,680,490. The Western states have the red fir, and balsam with fibre similar to that of the poplar, making the reduction to pulp by the soda process very easy. The Southern States also have suitable pulp woods, but like the Western States they have not yet developed the pulp industry. Alaska has also large areas of suitable pulp woods, but the lack of transportation facilities hinders their exploitation.

Canada has another large forest reserve of 153,000,000 acres. The provinces of Quebec, Ontario, New Brunswick, and Nova Scotia contain large tracts of spruce, poplar, balsam fir, beech and other woods not suitable for timber, but excellent for pulp wood. Quebec has 107,997,513 acres of forest, Ontario has 14,430,720 acres, Saskatchewan has 16,813,376 acres, and British Columbia has 172,140,000 acres. Because the Canadian woods are suitable for pulp, Canada can be depended upon to furnish pulp wood for hundreds of years.

Norway and Sweden with their rugged topography, and with their poor soil are almost dependent upon their forest and fishing industries. 24.4% of the total area of Norway and 50.9% of the total area of Sweden or about 50,000,000 acres are covered with forests. These two countries together with Russia and Germany are the chief sources of pulp wood in Europe. The people of Norway and Sweden realizing that their future prosperity depends in a large degree upon their forest and fishing industries have sent experts to the United States to find trees which are suited to that peculiar climate, in order that the now barren areas may be utilized.

Russia alone has 550,000,000 acres of forest land. Of course, this reserve is not all suitable for timber, but practically all of it can supply pulp wood. Finland has 49,000,000 acres of Norway pine, spruce, fir, and birch, most of which is exported in the raw state.

The forests of Germany are regulated by the government. 700,000 acres or one third of the 25% forest area in Germany is owned by the Crown; one sixth is owned by communities; one half by private owners, and the remainder by associations. By careful scientific forestry Germany produces nearly all the wood she needs for the manufacture of paper. The wood she imports comes from Norway and Finland. Even if the timber supply is rapidly decreasing in all countries, the supplies of wood which can be utilized in pulp manufacture seem inexhaustible because almost every tree large or small can be used.

THE CONSUMPTION OF PULP WOOD

Wood for the manufacture of pulp is received at the mill either rough, peeled, or rossed. Rossing is done by machinery; peeling is done by hand. A cord of rossed or peeled wood produces more pulp than a cord of rough wood, since the bark, which is of no value for pulp, forms an important part of the volume of the latter. The rough wood costs the least per cord, the peeled wood next, and the rossed wood costs the most.

The cost of domestic and imported spruce is causing manufacturers to use other woods. The domestic production of hemlock, 616,665 cords in 1911, formed 14.2% of the total. The poplar forms 8.5% of the total. The percentage used of the other woods, such as the balsam, fir, beech, pine, ash, elm, basswood, tamarack, cherry, and birch which were still of minor importance as pulp woods in 1910 when they formed only 18.3% of total consumption, but their use is steadily increasing as the present spruce and poplar become high-priced woods. In 1911 they formed nearly 20% of the total amount consumed.

CONSUMPTION BY THE VARIOUS PROCESSES OF MANUFACTURE

The mechanical process of reduction is simply the grinding of the fibres until they are microscopic in size; the fibres are then floated in water to form a smooth layer of fibre, the pores of which are not tightly closed. Our newspapers are made from wood reduced by the mechanical process. In the sulphite and soda processes of reduction, the fibres are treated with chemicals which first loosen the fibres and then, with the addition of a sizing, binds them together firmly forming the better grades of paper. In 1911 2,342,550 cords or 54% of the total consumed were reduced by the sulphite process, 15% by the soda process, and over 30% by the mechanical process. Spruce is nearly all reduced by the mechanical process; hemlock by the sulphite process, and poplar, pine, beech, maple, and all other species by the soda process. The soda process is likely to become the most important because the great majority of the woods can be reduced by that process.

PULP PRODUCTION IN THE UNITED STATES

The average cost of wood for 1909 was $8.62, 24c more than the average cost in 1908, and 45c more than in 1907. The average cost depends upon the nearness to the supply, the condition in which the wood is received, and the kind of wood used, spruce being the most expensive. The total quantity of pulp produced in the United States for 1911 was 2,686,134 tons of 2,000 pounds each. The average yield of pulp reported without distinction as to the kind of wood or the process employed is about 1240 pounds per cord of wood. The yield per cord is approximately 2,000 pounds for the mechanical or ground wood process, and 1,000 pounds by the sulphite and soda processes.

CONSUMPTION OF PULP WOOD AND THE PULP PRODUCTION OF CANADA

The woods used in Canada are mainly spruce and poplar, and some balsam fir in which the eastern provinces abound. Since 1910 the consumption of wood has rapidly increased. In 1914 there was an increased consumption of 104% over that of 1910. In 1914 66 mills consumed pulp wood valued at over $8,000,000. The Canadian government is stimulating the pulp industry by putting an export tax on wood shipped to the United States, and by giving a bonus to her manufacturers, thus decreasing the export of raw material, and also decreasing the import of finished product. Most of Canada's pulp wood is reduced by the mechanical process although the sulphite process is employed.

The Industry in European Countries

In Norway and Sweden the woods used are spruce, balsam, beech, and pine. The process of reduction is either the sulphite or the soda process depending upon the wood used. The Scandinavian countries normally export most of the unbleached pulp and the bleached pulp imported into the United States. The utilization of hydroelectric power for the manufacture of bleached and unbleached pulp ranks Norway and Sweden first in the export of these items which go chiefly to the European countries. Norway exported pulp to the United States valued at $5,000,000 in 1914, $2,888,000 in 1915. Sweden exported pulp valued at $5,140,000 in 1915.

Russia is mainly an exporter of raw material, chiefly in times of peace, to Germany, England, and Belgium. She imports most of her finished product from Norway and Germany.

Germany does not manufacture a large quantity of paper but she manufactures the better grades of paper, such as fine writing paper, and photographic prints which require more labor and scientific applications to manufacture. At the present time we are feeling the effects of the war upon our supply of photographic prints, the price of which has risen rapidly since the beginning of the war.

Some Substitutes for Pulp Wood for Future Use

Although wood is now the principal article used for the manufacture of paper, and although the present prices of wood for pulp cannot be complained of, yet paper makers are looking into the future to determine substitutes for wood. Because of the successful experiments of the British experts in the forests of China, bamboo now appears to be the most promising substitute for wood. One acre of land will produce about 5 tons of bamboo fibre which, on a commercial basis, will yield about 45% of pulp. Because bamboo grows so rapidly, a mill consuming 300 tons per week or 35,000 to 36,000 tons per year can easily be served from a grove only 4 miles wide and 5 miles long.

With the introduction of the Minch and De Segundo machines into the United States, Germany, France, and Brazil, the cotton hull fibre can be made suitable for paper-making. To obtain the first rights and patents on the product The American Cotton Hull Company has recently been incorporated.

The United Fruit Company has established a mill on one of its estates to demonstrate the use of *bagasse*, the name applied to the substance which remains after the juice has been pressed out of the sugar cane. So far all the tests which have been made with the McMullen extracting process have been successful and the United Fruit Company is giving the crop considerable attention. In mill practice *bagasse* gives a 45% air-dry unbleached cellulose or pulp.

With the use of special machinery, Mr. G. R. Sherwood, Washington, D. C., has found a method whereby cornstalks can be made suitable for paper making; the process has not yet been commercially developed.

If the weather conditions could be depended upon, and if supply would warrant the use of the necessary machinery, flax straw or fibre is perhaps one of the best substitutes for wood fibre. As the weather conditions cannot be depended upon, a crop of only 10% bleached fibre can be counted on as an annual yield.

There are other plants that have been experimented with and which might furnish fibre for paper-making should the necessity arise. Some of these are: kaffir corn, sorghum, cocoanut tree, and certain grasses.

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The United States under normal conditions holds third rank among the nations as an exporter of manufactures, and second rank as an exporter of domestic products of all kinds.

Exports of Manufactures in 1892 and 1912:

	1892 Dollars	1912 Dollars	% of Increase
United States	183,100,000	1,020,400,000	511.9
United Kingdom	827,000,000	1,873,603,000	126.5
Germany	463,862,000	1,430,142,000	208.3
France	362,608,000	756,155,000	108.5
Austria-Hungary	171,911,000	359,813,000	109.9
Belgium	No data	284,772,000	.....
Switzerland	95,091,000	194,969,000	105.0
Netherlands	113,440,000	253,320,000	123.3
Russia	10,918,000	39,810,000	263.7
Italy	94,165,000	255,377,000	171.2
Spain	No data	50,470,000	.....
Japan	No data	209,568,000	.....
Canada	7,000,000	35,800,000	411.4
Total of ten countries.	2,329,100,000	6,219,400,000	167.1

Our total exports in 1916 were about 5½ billion dollars, an advance of 60% over 1915 and three times those of 1912.

AN INSTANCE OF THE CHANGING VALUE OF GEOGRAPHICAL LOCATION

By JOHN L. RICH
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THERE are two distinct types of geographical location—physical, or physiographical; and vicinal.* By physiographical location is meant position on the earth's surface with respect to such physical factors as altitude, land forms, streams or water bodies, latitude, and climate. By vicinal location is meant position with respect to the various elements of the human environment such as centers of population and culture, markets, or neighboring social groups. Of these the values of the elements of physical environment are essentially fixed or change so slowly that the change can scarcely be noticed. Those of the human environment, on the other hand, since they involve mobile living organisms, are constantly changing as means of transportation and industries vary, and as centers of population and culture shift in the course of time.

Examples of the changed value of vicinal location, such as that of the British Isles in Roman as compared with modern times, have repeatedly been pointed out. A clear example, on a smaller scale, of such a change has been observed in the Catskill Mountains of New York State. The change has affected a considerable portion of the mountain region, but for the sake of definiteness, conditions in only a limited area, namely that of the Hobart Quadrangle at the head of Delaware River, are here described.

The topography of the Hobart Quadrangle is that of a plateau dissected by streams to a stage of late maturity, with a relief of a thousand to fifteen hundred feet. The valleys near the streams are broad and their flood plains and lower slopes are suitable for farming. The higher slopes are too steep for successful cultivation, but are suitable for pasture and forest. The valley bottoms and lower slopes are mainly cleared and cultivated, the lower steeper slopes are in pasture, and the upper slopes and mountain tops are forested. The region is admirably adapted to the dairying industry which is, and from the time of the earliest settlements has always been, the dominant form of agriculture. The plentiful rainfall of the mountains, the compact glacial till which floors the valleys, and the numerous springs which issue from the porous sandstone rocks combine to favor the growth of grass, making most excellent pasture and meadow land.

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* Semple, E. C., Influences of Geographic Environment, pp. 132-137.

The center of the quadrangle is about eighty miles distant by rail from Kingston on Hudson River, and about one hundred and eighty miles from New York City. By road the distance to Catskill, the nearest point on Hudson River, is fifty-five miles.

Before the building of the railroad in the decades from 1870 to 1890, the principal outlet for the region was overland to Catskill. Then, as now, the prevailing industry was dairying and the marketable product was butter. The dairymen were, of necessity, dependent on local resources of hay and grain for cattle feed. The greatest milk production was sought during the summer when the fresh pastures were available and the milk could be produced at the lowest cost. In the winter, the cows were allowed to go dry and little butter was made. Under those conditions the cattle required the minimum of feed and care and the hay gathered on the farms during the summer, supplemented by a small amount of home-grown grain, sufficed to keep them through the winter. In the late autumn, the farmers drew their summer's butter overland to Catskill, bringing back the groceries necessary for the winter. The trip required about one week. Another trip was sometimes made in the spring.

Under this regime the farmers of the region were prosperous and there were many fine, well-kept farms. Since the topography is such that much of the best farming lands lies near the heads of the larger valleys, many of the most profitable farms were located in such situations. Throughout the region the dominant factor, aside from personal ability, controlling the success of farming, was the character of the soil and the ease of cultivation. Since the distance to market was about the same from all parts of the quadrangle, or rather, since with only one or two trips per year a slightly greater distance from market was not a serious drawback, there was little advantage in any particular location as compared to another provided the soil and topography were equally favorable. The value of vicinal location for the region was essentially *undifferentiated.* One location was nearly, or quite, as favorable as another.

During the years from 1870 to 1894 the railroad was built across the eastern and central parts of the quadrangle along the valleys of the East and West Branches of Delaware River. With the advent of the railroad, the overland haul to Catskill was given up and a market was opened for milk as well as for butter. The demand on the part of New York and adjacent large cities was great and there was a change, hastened by the constantly increasing scarcity of labor, from the production of summer butter to that of winter milk. The change in season was caused by the insistent demand for milk in winter as well as in summer, and by the higher prices which were paid for winter milk.

The production of milk, particularly of winter milk, immediately made the dairymen strictly dependent upon the railroad as an outlet for their product and as a means of importing the large quantities of cattle feed, especially grain, needed for the production of the winter milk. Thus, for two vital necessities, the dairymen became closely dependent upon the railroad.

Moreover, milk to be shipped to New York must be delivered at the railroad every morning. This immediately placed all farms which happened to be situated far from the railroad at a great disadvantage, since the farmer with his team must either spend a considerable part of his day in hauling his milk to the railroad, or he must pay a cash sum of from two to ten or more cents per forty-quart can to hire it hauled. As a result of this, though the total prosperity of the region may have been increased, the farms situated at a distance from the railroad, even though they possessed excellent soil and favorable topography, began to decline in value, while those nearer to the railroad increased, even where soil conditions were less favorable.

How great, under the changed conditions, is the advantage enjoyed by the farmer living near the railroad can best be illustrated by a rough calculation.

Suppose two farms, equally good in all other respects, are situated, the one one-half mile from the railroad, the other five and one-half miles distant. Under the old system, by which the product was hauled once each year to Catskill, the more distant farmer was compelled to travel on the one or two round trips with his product at most only ten miles per trip farther than the other. This slight difference, coming as it did in the fall when other work was slack, was negligible. Under the present conditions, however, both farmers make the daily trip to the railroad with their milk. The one travels eleven miles, the other one mile. The more distant farmer is compelled to travel in the course of a year 3650 miles farther than the other. Assuming that the services of a man and team are worth $5.00 per day and that the round trip requires, on the average, one half day, the more distant farmer, delivering a full load—about one ton or 23 cans—of milk each day, is taxed $912.50 per year for his unfavorable location. Assuming that he produces only a partial load of milk per day, his tax will be less than this figure, but more than half, since the trip must be made; the time required to make the trip is nearly the same, and the wear and tear on horses and wagon is not reduced by half. If this farmer chooses, rather, to pay ten cents per can, the prevailing price for such a distance, to have his milk hauled to market and produces a ton, or 23 cans, of milk per day, his tax is about the same $839.50. Few individual farmers produce as much as this, but 10 cans is not an uncommon amount. For this amount the tax would be $365.00 per year, most of which would be clear profit for the farmer located near the railroad.

The result of the changed conditions has been to put a high economic premium upon location near the railroad. A marked concentration of the prosperity of the region has taken place.

Whereas, formerly, there were many profitable farms scattered over the quadrangle wherever soil and topographic conditions were favorable, they are now confined mainly to sections within moderate distances of the railroad, while farms farther away are declining in value in spite of the fact that not uncommonly they have better soil and topography. The fine old farm houses on these more distant farms, built before the advent of the railroad and now in very many instances sadly run down and neglected, bear mute witness to the change.

There can be no doubt that the present state of affairs is, in part, the result of a mal-adjustment to the new conditions brought about by the building of the railroad, and could be remedied, in some degree at least, by suitable adjustments. If, for instance, agriculture on the more distant farms were to be conducted on some other than a milk basis, the disadvantage of the present situation might be largely overcome, or if skimming stations or small creameries were to be established at favorable points too far from the railroad for profitable hauling, it is possible that the more concentrated products—cream and butter—might be hauled to the railroad without serious economic disadvantage. The cost of installation, upkeep, and labor would, however, counteract in some degree the advantages thus gained. In sections of the quadrangle most distant from the railroad a few such skimming stations have been established, but they are not numerous enough, and probably could not economically be numerous enough to counteract entirely the disadvantages of unfavorable location with raw milk production as the dominant industry on all farms, whether favorably or unfavorably located.

In certain valleys most distant from the railroad, e. g., the head of the Little Delaware, the change above described has not occurred. The farmers still confine their attention principally to butter making and to the raising of cattle and hogs, though local skimming stations have partly supplemented the home buttermaking. It is notable that these valleys still exemplify the old-time undifferentiated prosperity. The success of agriculture there is still controlled mainly by the physiographic factors—soil and topography. Many of the most prosperous farmers are located farthest from the railroad near the heads of the valleys where the broad, open, late mature valley-forms are best developed.

. . . .

The Catskill Mountain region furnishes a clear illustration of a change in the value of the geographic factor of vicinal location from the earlier state, under which the value was *undifferentiated* and was essentially the same for all parts of a considerable area, to the present condition of sharp *differentiation* within the larger area. The differentiation was evidently brought about, primarily, by a change in the means of transportation which caused readjustments of the prevailing industry. Similar readjustments should be expected everywhere to have followed the building of railroads or any other revolutionary changes in the means of transportation. It is worthy of note that the introduction of the automobile, with its accompanying improvement in country roads, must inevitably tend, in some degree, to break up the sharp differentiation now prevailing, though it can scarcely reestablish the former conditions.

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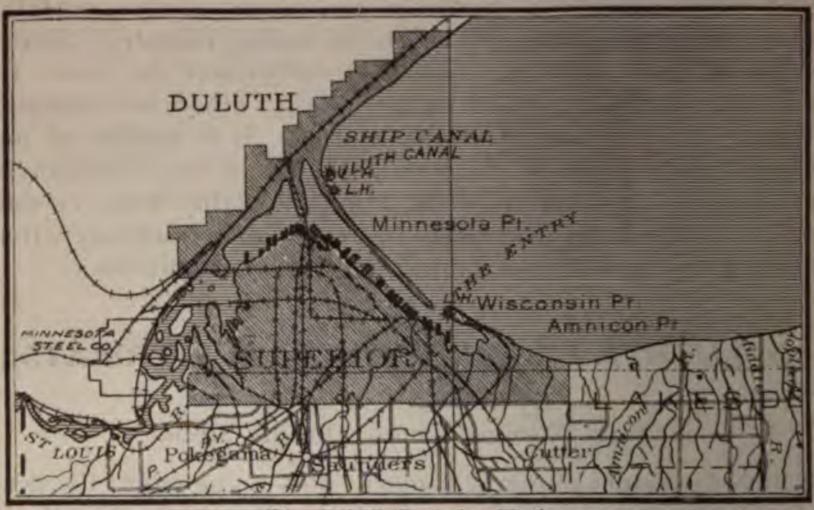
DULUTH, A PRODUCT OF THE WATERWAYS

By Eugene Van Cleef
State Normal School, Duluth, Minn.

UPON the slopes of a long range of hills rising out of the deeps of a great lake, there lies a city full of the spirit of youth that awaits with a glad welcome the approach of every mariner. It faces the rising run and is inspired each morning by the rays which dance and play upon the bosom of Lake Superior.

The inspiration of the wholesome sparkling waters of the world's largest fresh water lake is doubly emphasized by the resources which lie at Duluth's back door, for they rank among the "Unlimited." Their development during the past quarter of a century has been a factor of the Great Lakes. Had it not been for the Great Lakes, the grain and lumber of the Northwest would not have reached the markets for many years. Similar products from areas located much closer to the eastern market would have taken precedence, for by rail the nearer the market the less the freight charges. The water highway carries the freight for a mere fraction of the cost by rail. For example, the cost of carrying a bushel of grain averages in round numbers 2 cents from Duluth to Buffalo via water; via rail the same bushel approaches 10 cents. If 119,000,000 bushels of grain are shipped, as was the case during the season of 1915, one can appreciate the meaning of the difference in cost between rail and water shipments.

Duluth shipped 174,994,000 feet B. M. of lumber to the lower lake ports last year. She supplied the furnaces of the eastern industrial world with 26,316,084 tons of iron ore. In return the eastern coal miners sent 8,343,932 tons of hard and soft coal to be distributed throughout the Northwest. Many other products found their way upon these lakes, totaling the tremendous sum of $368,802,154.



The Duluth-Superior Harbor.

A more magnificent harbor for handling all of this commerce is perhaps nowhere else to be found. A peninsula 7 miles in length stretches from the western shore toward a similar one 3½ miles long extending from the eastern shore, both of which protect from the reach of the sometimes stormy inland sea all those sailing masters who would seek its shelter. The St. Louis River flowing from the southwest broadens its mouth a few miles above its junction with the lake, to afford still greater protection and harbor space.

Forty-nine miles of lineal quayage are available. That this figure is not one to be considered lightly, reflect for a moment that the lineal quayage of Liverpool and Birkenhead is only 36 miles, that Rotterdam has only 23 miles and Hamburg only 37 miles. The harbor is not to be classified with the small inlets and bays scattered here and there upon the country's lakes or even its coasts. It is a *world* harbor. Ships slightly over 600 feet in length and drawing 26 feet of water enter and dock, oftentimes without the aid of a tug. The world's great leviathans drawing 36 feet or more of water could, if necessary, be easily accommodated.

The Canadian Government has drawn plans for a route from Georgian Bay to Montreal via the Ottawa River to be known as the Georgian Bay Ship Canal, which if executed will allow ships to sail directly from Duluth to Liverpool and other European ports. One must remember that, on the average, the ocean freighters are no larger than the grain, ore, or coal boats of the Great Lakes. In fact many are smaller. No more skillful captains pilot them. Open this new waterway and Duluth is destined to grow even more marvelously than it has in the past score of years. The harbor will then compete with that of New York. The distance then between Duluth and Liverpool, all water route, will be 4245 miles; between New York and Liverpool it is now 3571 miles. The difference in distance of one or two sailing days is more or less of a negligible factor when the goods carried are non-perishable and the "fuel" for transportation is largely the wind. At present the distance between Duluth and Liverpool via the lake and rail route to New York, is 4712 statute miles. Think of not only a reduction of 500 miles but also of the saving in cost of transfer of cargo twice, namely at Buffalo and at New York.

Still another advantage graces Duluth. St. Louis River, one of the sources of the Great Lakes, affords over 40,000 horse power and holds 40,000 more awaiting the call. In the middle of its course and only fourteen miles from the city the meandering river is an apparently useless continuous rapid for a distance of about five miles. Through the keenness and ingenuity of one of the resident engineers these waters were gathered into a reservoir and carried over the uplands of the valley through an open canal 2 miles long and through a pipe line one mile in length to give an effective head of 375 feet. Between Niagara and the foot of the Rockies no waterfall can equal it. The power moves the street cars of Duluth and those of Superior, Wis., as well as the wheels of many industrial plants in the vicinity.

Here then is one of the stories of the beneficence of nature's waterway gifts. Remove the Great Lakes and the cities will perish. Improve the Great Lakes and not only Duluth, the "Zenith City of the Unsalted Seas", but all the other aspiring commercial and industrial communities dotting their shores will continue in the ascendency.

AIMS IN TEACHING GEOGRAPHY

As Laid Down by the Indianapolis Course of Study

THE aims of teaching geography, are in general, three:

1. To give the child a definite knowledge of the location and character of certain important places or regions on the surface of the earth—information which every intelligent person should have at his command. For example, the child should be taught the location of California, its chief city, its climate, and two or three of its main products.

2. To lead the child to see that the earth is adapted to man's habitation and, therefore, fitted by a wise Creator to be man's home. For example, three great needs of civilized man everywhere are food, shelter, and clothing; wanting these, he can not live. These necessities are provided in the northeastern section of the United States, partly by the products of New England soil and party by bringing from the West and South other necessary articles, as flour and cotton. In Cuba the matter of shelter is not so important as in Indiana; on the other hand, the Desert of Sahara is not fitted for man's habitation; and large as it is, this portion of the earth's surface is not required for his use. In spite of the great population of the world, there are productive regions enough to supply all the wants of man.

3. To show the interdependence of man. For example, New England depends upon the West for part of its food, and the West upon the East for numerous manufactured articles. Every breakfast table contains the contributions of various countries and peoples. A short wheat harvest in one section of the world means dearer bread everywhere.

To attain the foregoing objects, it is necessary to cultivate the child's powers of observation, reason, and imagination. The observation is trained by noticing, from season to season, the changing position of the sun; by classifying and naming the trees in the child's own neighborhood; by teaching the reading of maps. The reason is trained by inferring that snow is a form of vapor; by noting how the fertility of Egypt is dependent upon the rains of equatorial Africa; by discovering the four conditions favoring the building of steamships on the Clyde; by explaining the cause of the deficiency in rainfall in certain parts of the United States. The imagination is trained by the effort to make mental pictures of the mountains and rivers of other countries, of the scenery, climate, flora and fauna, races of men and their institutions, manners, customs, and occupations. The basis for these images is the child's observation of the hills and streams *near his* home. By the aid of pictures and descriptions, the child is helped to imagine the dense vegetation of the Amazon Valley, and the great wheat fields of Dakota.

Geography, then, is not only a description of the earth's surface, but a study of the people who inhabit it, and their life as affected by physical environment. This study should possess a human interest, showing the earth as the home of mankind and its adaptation to man's activities.

INDIANAPOLIS PLAN FOR THE STUDY OF AFRICA

(Grade 6B)

Problem: Considering the proximity of Africa to Europe, why have there been so few settlements and explorations until recently?

I. *Conditions causing delayed development.*

  A. What have the location and climate of Africa to do with its delayed development?

    1. Latitude. Chiefly in torrid zone.

    2. Climate. Unhealthful.

      a. Excessive heat and scarcity of rain causing deserts.

      b. Excessive heat and overabundance of rain resulting in tropical jungles, plants and animals.

      c. Coastlands also malarial.

  B. What has the *surface* to do with the delayed development?

    1. Almost a continuous rim of mountains near coast. Name the important ranges. Study the Atlas mountains.

    2. Interior. Plateaus and deserts. Make a careful study of the two important deserts.

    3. Coastal plains. Short. Natural resources.

  C. What has the *coast line* to do with the delayed development? Regular coast line and few harbors.

  D. What has the *drainage* to do with the delayed development? Well supplied with rivers. Insurmountable falls and rapids, especially near mouth of rivers. Study the chief lakes and the five most important river systems.

  E. What had the *character* of the early inhabitants to do with the delayed development?

1. Africa, the home of the lowest types of savages.
    - a. Unable to develop continent themselves.
    - b. Resisted civilization.
    - c. Contrast the savages of the jungles, savannas, and coastal plains.
2. Character of Egyptians. High civilization that early ceased to be progressive.
3. Greek and Roman influence not permanent.
4. Mohammedan invasion. Limited by their religious ideas.

II. *Contrasts.*

- A. United States, discovered centuries later than Africa, has developed much more rapidly. Contrast as to
    1. Location.
    2. Climate.
    3. Surface.
    4. Coastline.
    5. Drainage.
    6. Character of people.
- B. Make a similar contrast between Africa and Europe.
- C. Compare Africa with Australia.

III. *Modern progress improving conditions due to entrance of the great commercial nations of Europe.*

- A. Reasons for European appropriation of Africa.
    1. Commercial expansion.
        - a. About the sixteenth century began the struggle for commercial supremacy among the leading nations of Europe; namely, Spain, Portugal, Holland, France, and England.
        - b. Development of means of transportation from sailboat to the modern steamship. Why was the sailboat a hindrance to the development of Africa?
    2. Increased population demanded new territory and led to colonization in Africa.
    3. Industrial development. Factories required more raw material than home countries could produce.
- B. Result of European appropriation of Africa. With the exception of Liberia and Abyssinia practically the whole of Africa is under the domination of European countries; namely, England, Germany, France, Belgium, Portugal, and Italy. In studying the influence of the foregoing countries in Africa consider the following points:

1. Territory owned; territory controlled.
2. Cities to be noted: Cairo, Alexandria, Cape Town, Johannesburg, Kimberly, Khartum. Note European origin of the names of cities.
3. Service of mother country to colonies.
    a. Material improvements.
    b. Culture.
4. Value of colonies to mother countries.
5. Contrast original industrial conditions with those of the present, proving that the white man is revolutionizing all industrial methods, especially those of farming, stock-raising, mining, and commerce.

After this general survey of Africa will come the detailed study of important countries. The following deserve special attention:

British South Africa.
Egypt.
Barbary States.
Congo region.
French possessions.
German possessions.
Liberia.

The study of these countries should also be approached from a problematical point of view.

EGYPT

I. *Why was it so great formerly?*

A. Nile river.
1. Annual overflow fertilizing region.
2. Transportation.

B. Isolated position gave protection against invasion, resulting in internal development.
1. Bordering seas.
2. Surrounding desert.

C. Character of people.
From the Nile came the germ of much found in the later culture of the peoples of western Asia, of the Greeks and Romans, and of the nations of modern Europe.—Myers.
1. Peaceful.
2. Conservative. Great attention to internal development rather than to foreign affairs.
2. Culture.

a. Art. Glass coloring; gem cutting, design (scarabaeus, lotus, etc.); architecture (pyramids and temples).
b. Literature.
c. Science. Geometry, astronomy, and medicine.

(After many centuries of civilization the nation declined.)

II. *Modern conditions.*

A. People. A great mixture of peoples from all parts of the world, resulting in a lack of national spirit, thus making foreign encroachment easy.

B. Government.
1. Monarchy. Chief ruler a khedive.
2. Under the control of England. Very valuable to England on account of its location and its products.
  a. Agriculture. Extensive irrigation under British direction. Assuan dam regulates the distribution of water. Cotton, rice, wheat, maize, sugar, millet.
  b. Manufacturing. Unimportant. Jewelry and leather work.
  c. Commerce. One of the chief commercial countries of Africa.
    1. Railroad developing. Cape to Cairo Railroad the most important.
    2. Nile river.
    3. Caravans.
    4. Foreign commerce. Great transit trade for Europe and Africa. Exports cotton, ivory, palm oil, ostrich feathers. Imports manufactured products.
  d. Importance of Cairo, Alexandria, and Port Said.

SUGGESTIVE QUESTIONS

1. Explain the various methods of transportation in Africa. Compare commerce in Africa with that in the United States.

2. Compare a cargo of goods leaving New York for Liverpool with that of a caravan from the Sudan region to Cairo or Alexandria.

3. Of what great advantage is the Suez Canal to the commercial world?

4. Compare the cost and labor of constructing this canal with that of Panama Canal. Under the direction of what nation was each built?

5. Compare size and value of cargoes passing through Suez Canal and that of Sault Ste. Marie. Why do sailing vessels not use the Suez Canal?

6. Why are the political boundary lines in Africa so fluctuating? Compare with South America.

7. Why is it better for Egypt to be controlled by a Western progressive civilization, rather than by an Oriental power such as Turkey?

8. What can you say of the railroads in Africa at present? Discuss the "Cairo to Cape Town" railroad. What nation is building it, and for what special purpose? Compare and contrast present method of transportation with that of Africa before the coming of the modern, progressive white man.

9. How do the rivers of Africa compare with the Mississippi or the Amazon as commercial routes?

10. Why are so many of the black race of Africa in the United States?

11. Tell what Liberia is, and show what relation exists between that republic and the United States. The resemblance between its government and ours. (Founded by free negroes sent by the American Colonization Society in 1822—declared independent in 1847).

12. Discuss the work of the European nations colonizing and claiming nearly the entire continent of Africa. Show how these colonies grew from small trading posts into present proportions. Which is the dominant power now?

13. Why has the United States made no claim to possessions in Africa?

14. Compare seasons in Africa with those in the United States. In which of these countries is the "Fourth of July" on a winter day and Christmas on a summer day? Which side of a hill is better located for agriculture in the United States? What about this in Africa? Discuss these facts.

15. Which coast of Africa is more like the countries of Southern Europe as to climate and results? Which portion of Africa resembles the jungles of the Amazon? Where are most of the settlements in Africa being made now?

16. In what portion of Africa did the Europeans settle largely at first? Why?

17. Compare the African farmer with the farmer of the prairies of the United States.

18. Compare the lakes of Africa with those of the United States—as to number and value to commerce.

CURRENT MATERIAL FOR THE GEOGRAPHY TEACHER

Map of Florida Just Issued by United States Geological Survey

In 1909 the United States and nearly all the other principal countries of the world, by international agreement, planned to prepare maps of the entire surface of the earth, to be published on a scale one-millionth of actual size, or about 1 inch to every 16 miles. The United States Geological Survey is preparing the maps of this series that include the United States. All the maps are to be uniform in shape and general appearance and are to have the same conventional signs. The Geological Survey is utilizing the data collected for the world maps in preparing and publishing maps of each State on a larger scale—about 1 inch to every 8 miles. A map of the entire United States on this scale would cover a sheet measuring 20 by 31 feet.

The Survey has already issued such maps for 33 States, the latest one being that of Florida, which is one of the largest of the series. It measures 44½ by 61 inches, and is sold and delivered by the Geological Survey, Washington, D. C., for 45 cents.

Enormous Cost of Bad Roads

There is no need of discussing the importance of good roads. They are essential to comfortable travel, to the economic production and distribution of farm products, to the development especially of satisfactory rural schools, and to the improvement of the social life of the nation. Bad roads are very expensive possessions. It is estimated that it costs 23 cents under existing conditions to haul a ton a mile on the average country road and only 13 cents on a properly improved road, but this is not all the story. The direct cost is very great and the indirect costs are possibly even greater. With bad roads the farmer is compelled to haul when he should be engaged in other activities, while with good roads he can plan his operations without reference to the weather. The States and the local units, as has been intimated, have strikingly recognized these truths by greatly increasing their appropriations and by devising better machinery.—From *The American Review of Reviews*

Rice in the United States

Rough rice, the material used in this industry, generally reaches the mill in the same condition in which it leaves the thrasher and contains more or less dirt and other foreign substances. The mills clean the rough rice, remove the outer shell, or hull, and the inner cuticle, or bran, and usually polish the grain. At one time rice was generally cleaned on the plantations producing it, but now, with the exception of small quantities produced outside of the important rice-growing districts, it is all treated in specially equipped mills. For years it was the practice to give the rice a high polish in order to improve its appearance, but it has been found that this treatment results in removing some of the most nutritious parts of the grain, and the use of rice which has been subjected to little or no polishing is now coming into favor.

The change in the habitat of rice in the United States has necessarily brought about a change in the location of the rice mills. Whereas most of the cleaning and polishing establishments were formerly in the Carolinas and Georgia, the industry in these states has almost disappeared and now nearly all the mills are located in Louisiana, Texas, and Arkansas, with a few small ones in the Pacific coast cities.

Formerly the rough rice was generally milled on contract for a stipulated price, or for a portion of the rice itself. With the erection of the larger and more up-to-date mills in the new rice-growing districts, however, has come the general practice of buying the rough rice outright, milling it, and selling the various products obtained. The industry has accordingly changed almost entirely from a custom-milling to a merchant-milling basis. Except in the case of the Pacific coast cities, where only foreign rice was treated, the mills were generally located in the immediate vicinities where the rice was grown. Louisiana reported 56.3 per cent of the total value of products, Texas 31.3 per cent, and Arkansas 8 per cent, these three states combined contributing 95.6 per cent of the total for the country. In 1914 there were 59 establishments engaged primarily in the cleaning and polishing of rice.

THE RUBBER INDUSTRY

The production of the greater part of the world's raw rubber by British enterprise and the manufacture of 65 per cent of it in the United States is an apparent anomaly in international commerce. It is proof of the breadth of British commercial development, and of the ability of American manufactures, backed by the greatest domestic consumption in the world, to keep well in the van of scientific industrial efficiency when production is well organized, on the side of progressive research as well as of economic manufacture and sale. At the annual meeting of the Rubber Plantations Investment Trust, Ltd., in London a few weeks ago, the following statement about the current rubb
uation in the world was made:

The world's output of rubber in 1915 was approximately 150,000 tons, against 120,000 in 1914 the proportion of plantation-grown rubber being 104,000 tons in 1915 against 71,000 tons in 1914; the production of wild rubber shows a small decline, so that rather more than the total increase in the world's production is accounted for by the increased production of plantation rubber. It is anticipated that the output of plantation rubber in 1916 will be about 140,000 tons; the increase of 1916 output over 1915 being about the same as the increase in 1915 over 1914.

Approximately 83 per cent of the plantation rubber to be produced in 1916 will be grown in British colonies, and when you take into account the large proportion of rubber produced in the Dutch East Indies on estates owned by British companies, fully 90 per cent of the present output of plantation rubber may be attributed to British enterprise.

Although the rubber plantations which British investment enterprise has developed are yearly increasing output at a rapid rate, they are hardly keeping up with the world's increasing demands for rubber. The Philippines, among our own possessions, and many neutral lands in the rubber zone of the world, offer opportunities for American investment enterprise of the same kind and considering the great importance of rubber, also the possibility of the establishment of a system of protective export duties on such raw materials over the British Empire, a development of the same kind under American auspices might prove of great future national advantage.—[*The Americas.*]

ALASKAN GLACIER RETREATS

Fifteen years ago a member of the United States Geological Survey mapped the front of the Barry Glacier, which is in the northwest corner of Prince William Sound, Alaska. In 1910 it was found that the front of the glacier had gone back about 3 miles from the position it occupied in 1899. B. L. Johnson, of the Geological Survey, examined the front of Barry Glacier in the fall of 1914 and determined that the total retreat of the glacier between 1910 and 1914 appeared to be about 8,200 feet, a retreat of 4½ miles in 15 years. A short account of the retreat of this glacier by Mr. Johnson has just been published as Professional Paper 98-C. It includes a sketch map showing the position of the glacier front in seven different years and several reproductions of photographs of the glacier.

A copy of the report may be obtained free on application to the Director of the United States Geological Survey at Washington, D. C.

GREAT ALASKAN EARTHQUAKE

The Yakutat Bay earthquake occurred on September 3, 1899, and was followed during the next three weeks by many less violent shocks. The area of greatest intensity lay along the flanks of the St. Elias Range, in a region of high mountains and superb glaciers, and the movement was accompanied by enormous avalanches and rock slides. This was a vivid demonstration that the growth of mountains is still in progress. At some places in the region the land subsided and forests were submerged. At most places, however, the land rose, and many points which before had lain below sea level were elevated above it. Barnacles which had lived in ocean water were found 47 feet above the sea.

In addition to making an exhaustive study of the movements of the land which took place in the Yakutat Bay region and of the effects of the earthquake on the many glaciers of the region, the writers amassed a great fund of information in regard to the intensity of the quake throughout the whole area within which it was sensible and recorded the testimony of many witnesses. The shock was felt at distances of 670 and 1,200 miles in opposite directions from Yakutat Bay, and the area of the region over which the tremblings were felt is more than 1,500,000 square miles. This gives the Yakutat Bay earthquake a place among the very greatest earthquakes of historic times. Previous great shocks, without exception, resulted in heavy loss of life, the number of persons killed reaching in one of them the enormous total of over 60,000. The Yakutat Bay shock was fortunately free from fatalities because the region in which it occurred is sparsely settled.

This report—"The Earthquakes at Yakutat Bay, Alaska, in September, 1899"—is illustrated with halftone views, showing the effects of the earthquake, and with maps of the region and seismograms of the shock as recorded at places as far distant as Batavia, Java; Cape Town, South Africa; and Catania, Italy. The report may be obtained from the Superintendent of Documents, Washington, D. C., at a cost of 60 cents in paper and 75 cents in cloth binding.

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GEOGRAPHICAL ITEMS

The American Geographical Society of New York received into membership 1118 new Fellows at the November meeting.

Dr. Hamilton Rice and his party sailed from New York Nov. 15 for the purpose of carrying on a systematic exploration of certain rivers of the Amazon system.

Brazil has arranged for the importation of 20,000 Japanese farm laborers during the next two years; they will be employed mainly on plantations in the cultivation of rice, beans, and coffee. This will add another racial element to Brazil's already badly mixed population. There is no color line in Brazil.

A line of steamers has been established on the Paraguay River between Rosario in Argentina, and Puerto Sueriz, 1800 miles up the river in Bolivia. In the larger part of South America, the rivers are still about the only avenues of travel and transportation, just as they once were in the United States and still are in part of Canada.

A far-reaching program of railroad building is in progress in Russia, partly for immediate and partly for future needs.

Captain Roald Amundsen, discoverer of the South Pole, came to America in November for the purpose of purchasing an aeroplane to be used in his proposed attempt to reach the North Pole by a combination of ship and aeroplane.

Professor Robert DeC. Ward of Harvard University, will be the visiting lecturer of 1916-17 at the University of Wisconsin, Department of Geology and Geography.

Professor Walter S. Tower of the Department of Geography, University of Chicago, has been lecturing at Harvard University during the fall quarter, but returned to Chicago immediately after the opening of the year.

Professor R. S. Holway, head of the Department of Geography of the University of California, is on leave of absence and attended the meeting of the Association of American Geographers in New York.

The University of London has joined the ranks of the British Universities that give a diploma in geography. British universities, with characteristic conservatism, have been much slower than those of the continent in taking up geography as a serious branch of higher learning.

The National Council of Geography Teachers has reached a membership of over 800. It will probably reach the thousand mark by June.

Bulletin No. 4 of the Illinois Council of Geography Teachers appeared in December. It contains an article on "The Need of a General School Atlas," by Professor J. Paul Goode of the University of Chicago. Miss Stark, president of the Illinois Council, is doing the geography teachers of her state a genuine service through these bulletins.

MEETING OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS

The 1916 meeting of the Association of American Geographers was held at Columbia University, New York, December 28, 29, and 30. The attendance was somewhat larger than the average, due in part at least to the presence of a considerable number of interested geographers and teachers of geography who are not members of the Association. Some of the important papers were presented by non-members who had been invited by the secretary.

The quality of the papers presented was up to the high standard which the Association has maintained, yet an unusually large number of them were geographical in only a limited sense. The majority of them dealt with physical, geological and meteorological topics and many of these gave little or no attention to human or other life responses. In recent years such papers have been in the minority in the meetings of the Association, and this year's program probably represents an exception rather than any change in the trend of the Association's work.

We can not avoid a feeling of regret that nearly half of the members present did not offer papers; among them were several of the older and stronger men of the Association to whom the younger men look for leadership and inspiration.

The following officers were elected for 1917:

President, R. DeC. Ward.
Vice-Presidents, W. H. Hobbs, Harlan H. Barrows.
Secretary, Richard E. Dodge.
Treasurer, Francois E. Matthes.
Councilor, A. P. Brigham.

The Council announced that the invitation of Chicago University had been accepted, and that the meeting of December, 1917, will be held there.

Following is the program of an interesting symposium on The Geography of the War, which was conducted by Professor Douglas Wilson Johnson on Friday evening, December 29:

The Geographic Factor in Military Problems—Douglas W. Johnson.
The Plains of Northern France—Sumner W. Cushing.
Rivers and Marshes of the Eastern Front—Lawrence Martin.
The Danube Valley and the Balkan Complex—Ellsworth Huntington.
The Carpathian Mountains and Transylvanian Alps—Emmanuel De Martonne.

Geographic Aspects of the War on Water—**J. Paul Goode.**
Geographic Aspects of the War in the Air—**R. DeC. Ward.**
Economic Geography of the War—**J. Russell Smith.**

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THE NEW YORK COUNCIL COMPLETES ITS ORGANIZATION

The first step in the organization of the New York State Council of Geography Teachers was a conference of the geography teachers of the State Normal Schools held March 17, 1916, in Buffalo. The earnest participation in the full and free discussion of problems pertinent to the training of teachers for the schools of the State, and the recommendations for betterment unanimously passed, augur well for the future of the geography work of the Empire State.

Through the support of this organization and the Advisory Board of the State Council, a Geography Section was secured in the State Teachers' Association held November 28 and 29. Practical and helpful topics in geography were excellently presented by some of the leading geographers of the state at each of the three sessions. The need of this work was shown by the large attendance—between 900 and 1000 being present at some of the sessions—and by the response for membership in the National and State Councils. The exhibit of the best available materials as aids in the teaching of geography, was greatly appreciated by the teachers.

New York State is fortunate in having the following able geographers on its Advisory Board: Prof. Albert P. Brigham, Colgate University, Hamilton, N. Y.; Prof. C. T. Mc Farlane, Columbia University, New York City; Miss Clara B. Kirchwey, and Miss Caroline W. Hotchkiss, Horace Mann School, New York City; Dr. O. D. von Engeln, Cornell University, Ithaca, N. Y., and Miss Marion B. Forsythe, State Normal School, Potsdam, N. Y.

The cause of better geography teaching in New York State is only launched; plans for furthering the genuine helpfulness of the State Council to every member and for arousing an interest in geographical topics among the public, are being perfected. The program of the Buffalo meeting follows.

GEOGRAPHY SECTION.

Hutchinson High School, Room 340.

President, Alice Wessa, New York City.

Tuesday Morning, 9:30 o'clock.

Suggestions for Home Geography in the Third Grade, Miss Marion B. Forsythe, State Normal School, Potsdam.

The Geography of New York State, Prof. Albert P. Brigham, Colgate University, Hamilton.

The Purpose of the National Council of Geography Teachers and the Organization of the New York State Branch.

Tuesday Afternoon, 2 o'clock.

Place of "Conservation of Natural Resources Concepts" in Geography Teaching, Dr. O. D. von Engeln, Cornell University, Ithaca.

The Influence of the Junior High School Upon Geography, Miss Clara B. Kirchwey, Horace Mann School, New York City.

Wednesday Morning, 9 o'clock.

Conference of the Geography Teachers of the State Normal Schools. Round Table Discussion: (1) The Use of Textbooks and Maps in the Fourth Grade. (2) What do We Want Our Students in the Grades to Know About Geography at the End of the Course?

An exhibit of the best available materials as aids in the teaching of Geography was prepared by Miss Caroline W. Hotchkiss of the Horace Mann School, New York City.

(Signed) Alice Wessa,
New York State Representative.

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SUPERLATIVES

In an old grammar that we studied in the little red school house was the sentence (for parsing): "The axis of the earth sticks up visibly through each and every town of New England." The traveler finds this to be true of all sections of the United States and of the nation as a whole. We are very fond of telling visitors that our state has more dairy cows, or quarries more gypsum, or raises more cranberries than any other state; or that our city has the biggest tooth-pick factory in the world. Our authority for the last mentioned type of superlative may be only the local newspaper but in such cases no better authori needed.

The Journal of Geography is disposed to announce a few superlatives regarding geographical matters in this country.

1. That we have the largest geographical society in the world—the National Geographic Society of Washington, with nearly 500,000 members.
2. That we have the geographical society with the most exacting membership requirements in the world—the Association of American Geographers, which finds only one person in a million in our population able to meet its qualifications for membership.
3. That we have the most generous geographical society in the world—the American Geographical Society of New York, whose generosity toward various geographical activities is splendidly unselfish and disinterested.
4. That we have the most beautiful geographical magazine in the world—the National Geographic Magazine, with a circulation of over 500,000 copies—fourteen carloads a month.
5. That we have in the Geographical Review a scientific magazine which is rapidly approaching the best of its type in the world if indeed it has not already reached that status.
6. That we have the best elementary text books in geography produced in any country. R. H. W.

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THE PASSING OF THE GREAT RACE

The above is the title of a new book written by Madison Grant.* The "Great Race" is the Nordic whose home land is around the Baltic and North Seas. The purpose of this brief note is merely to call attention to two of Mr. Grant's positive convictions which are of interest to geographers. He is unqualified in his belief that racial qualities are so deep-seated as to be all important. He says: "This something which we call 'genius' is not a matter of family but of stock or strain and is inherited in precisely the same manner as are the purely physical characters, * * * but it is race, always race, that produces genius." The reader wonders what is the reason that one race is so superior to others, for race is a result of the factors that produced it; what are those factors? Later in the book (p. 152) speaking of the "Great Race" Mr. Grant says: "The vigor and power of the Nordic race as a whole is such that it could not have been evolved in so restricted an area as southern Sweden. * * * The Nordics must have had a larger field for their specialization and a longer period for their evolution. * * * For the development of so marked a type, there is required a con-

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**Scribner's, $2.00* net

tinental area isolated and protected for long ages from the intrusion of other races. The climatic conditions must have been such as to impose a rigid elimination of defectives through the agency of hard winters and the necessity of industry and foresight. * * * Such demands on energy, if long continued, would produce a strong, virile, and self contained race."

In short, the author considers that race is everything and then holds that race gets its essential qualities from geographical environment.

◆

PORTO RICO'S GROWTH IN PRODUCTION AND EXPORT

In fifteen years, Porto Rico has shown an eight-fold increase in exports and a ten-fold increase in imports, the growth both relative and proportional being overwhelmingly located in the statistics of the island's trade with us. The crux of the situation may be shown in these selected figures:

Porto Rico's Exports

	To the U. S.	To Other Countries	Total
1901	$ 5,581,288	$3,002,679	$ 8,583,967
1910	32,095,645	5,864,574	37,960,219
1916	60,952,768	5,778,805	66,731,573

Porto Rico's Imports

	From the U. S.	From Other Countries	Total
1901	$ 6,965,408	$1,952,728	$ 8,918,136
1910	27,097,654	3,537,201	30,634,855
1916	35,892,515	3,058,641	38,951,156

Under the helpful encouragement of the government, Porto Rico's production of sugar, coffee, tobacco, and fruits, and the successful marketing of them, have literally sprung up. In 1901, the island exported $4,715,611 worth of sugar at $68.43 per ton. In the year ended June 30, it exported $45,809,445 worth at $107,79 per ton. In 1901, $1,678,765 worth of coffee was exported; in 1915, $7,082,791 worth. Orange shipments valued at $84,475 in 1901 rose to $790,797 last year; pineapples, green and canned and grapefruit, in 1901 included in $16,992 worth of "other fruit," have risen in the export record to $1,176,406 worth of pineapples, $122,876 worth of canned pineapples, and $837,014 worth of grapefruit; $8,834 worth of cocoanuts have sprung up to $4
573 worth.—[*The Americas.*]

OFFICIAL ESTIMATES OF THE POPULATION OF THE UNITED STATES FOR JANUARY 1, 1917

Continental United States	102,826,309
Alabama	2,348,273
Arizona	259,666
Arkansas	1,753,033
California	2,983,843
Colorado	975,190
Connecticut	1,254,926
Delaware	214,270
Dist. of Columbia	366,631
Florida	904,839
Georgia	2,875,953
Idaho	436,881
Illinois	6,193,626
Indiana	2,826,154
Iowa	2,224,771
Kansas	1,840,707
Kentucky	2,386,866
Louisiana	1,843,042
Maine	774,914
Maryland	1,368,240
Massachusetts	3,747,564
Michigan	3,074,560
Minnesota	2,296,024
Mississippi	1,964,122
Missouri	3,420,143
Montana	466,214
Nebraska	1,277,750
Nevada	108,736
New Hampshire	443,467
New Jersey	2,981,105
New Mexico	416,966
New York	10,366,778
North Carolina	2,418,559
North Dakota	752,260
Ohio	5,181,220
Oklahoma	2,245,968
Oregon	848,866
Pennsylvania	8,591,029
Rhode Island	620,090
South Carolina	1,634,340
South Dakota	707,740
Tennessee	2,296,316
Texas	4,472,494
Utah	438,974
Vermont	364,322
Virginia	2,202,522
Washington	1,565,810
West Virginia	1,399,320
Wisconsin	2,513,758
Wyoming	182,264
Outlying Possessions	
Alaska	64,873
Guam (a)	12,866
Hawaii	217,660
Panama Canal Zone (b)	31,048
Philippine Islands	8,879,999
Porto Rico	1,223,981
Samoa (a)	7,426
Total United States (c)	113,309,285

(a) Enumeration by Governor, 1913.

(b) Police Census, 1916.

(c) Includes 45,123 persons in military and naval service stationed abroad.

RECENT PUBLICATIONS

Elementary Economic Geography. By Charles Redway Dryer. 415 pages. The American Book Co., New York. 1916.

This text was written as the result of the demand "for text-books dealing with commerce and industry." The author has endeavored to make the work more than a commercial geography—"a study of the ways in which different peoples in different regions get a living."

The book is divided into two parts. The first part called "Human Economies and Their Natural Foundations" is an introduction which leads to a better understanding of the more difficult portions which follow. The author discusses the economic relations of seven different primitive peoples. This is followed by several chapters on home economies based on familiar conditions which relate to resources and industries. This first part is concrete and on the whole very good.

The second part is devoted to the "Economic Geography of the United States." The country is divided into the following economic regions:

The Middle West (77 pp.); The Eastern States (64 pp.); The Southern States (45 pp.); The Interior States (41 pp.); The Pacific States (38 pp.); The remaining pages are given over to a brief discussion of outlying possessions, foreign commerce, economic work of the government and a statistical appendix. Much attention is given to the discussion of cities as the author believes that they are the "final and characteristic product of modern economic forces acting under geographic influences." The book is well supplied with illustrations and there is a wealth of splendid material but the second part seems a little heavy for the pupils who probably will use the book most.

F. E. W.

Rider's New York City and Vicinity. By Fremont Rider and assistants. Henry Holt & Co., New York. 1916. Pocket size. 506 pp. $3.10 net.

The book is an American Baedeker for New York City, or rather for the New York Metropolitan District. The author says he has taken the "admirable Baedeker series" for his model. There are seventeen maps in color and floor plans of the five public buildings in which visitors are likely to be most interested. The scope of the book may be gathered from the following larger divisions: Preliminary Information, Entering New York, Downtown, Midtown, Uptown, The Bronx, Brooklyn, St Island, the Jersey shore, Newark.

AN INDUSTRIAL GEOGRAPHY OF BRITAIN. By William J. Claxton. Published by George G. Harrap & Co., London. 143 pp. 10d.

The author says of his little book, "Perhaps a better title would have been, 'Natural Gifts to Britain.'" The book is an effort to show the influence of the physical features of Britain upon her industrial development and is intended to accompany the author's Industrial History of Great Britain.

THE WHEAT INDUSTRY. By N. A. Bengtson and Donee Griffith, of the University of Nebraska. The Macmillan Company, New York. 1915. pp. XII+337.

This is the first volume in the Macmillan Industrial Series, edited by Prof. George E. Condra of the University of Nebraska. Professor Bengtson and Miss Griffith have two excellent qualifications for writing the book, namely, abundant first hand knowledge of the subject and the experienced, successful teacher's skill in presentation. The seventeen chapters treat of The Wheat Plant, its Cultivation, Harvesting, Threshing, Transportation and Storage; Marketing, Milling, and Uses of the various products; also of wheat in each of the larger producing countries,—Australia, Argentina, Canada, certain Asiatic countries, and the United States. There are 130 illustrations, including a number of black and white maps. Questions and Exercises of excellence follow each chapter. The book is designed to serve as a reference book or reader in seventh, eighth, or even ninth grade. The plan calls for excursions, the collecting of specimens, and the making of reports by the pupils. The book is not only authoritative, but it is thoroughly interesting. High school teachers of Commercial Geography will find it useful. It is to be hoped that succeeding books in the series will be as good.

PHYSICAL AND INDUSTRIAL GEOGRAPHY OF LANCASTER COUNTY, PA. By H. Justin Roddy, Millersville Normal School. New Era Press, Lancaster, Pa. 1916. 113 pp. 75 cents net.

The first half of the book treats of the physical geography of the county, and the second half of the economic geography. Lancaster County is a part of the most interesting section of Pennsylvania. Through it passed most of the great highways between Philadelphia and the West; Indian trail, colonial road, the great coach and freight road, canal, horse railroad, and the present main line of the Pennsylvania Railroad.

The whole region is full of the types which belong to the borderland of history and geography. The author has presented his material most interestingly, but the half tones and some of the maps are not so good as the book deserves.

Suggestions for Laboratory Work and Equipment in Physical Geography. By F. V. Emerson, Louisiana State University, Baton Rouge. Bulletin of Louisiana State University. Vol. VIII-N. S. No. 9. Oct., 1916.

The little bulletin of 38 pages is designed "to aid teachers of physical geography in preparing laboratory work and equipping the laboratory." Copies of this helpful bulletin may be obtained by addressing Prof. F. V. Emerson, Dept. of Geology, State University, Baton Rouge, La.

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WORLD'S PRODUCTION OF COTTON, 1914-15

[From *Commercial America* for Dec.]

(000 omitted)

United States	16984	Brazil	400
India	4186	Persia	150
China	2500	Peru	125
Egypt	1285	Turkey	120
Russia	1126	Mexico	75

Cotton Production in United States

	1914. Bales	1915. Bales
Texas	4,592,112	3,227,480
Georgia	2,718,037	1,908,673
Alabama	1,751,375	1,020,839
South Carolina	1,533,810	1,133,919
Oklahoma	1,262,176	639,626
Mississippi	1,245,535	953,965
Arkansas	1,016,170	816,002
North Carolina	930,631	699,494
Louisiana	449,458	341,063
Tennessee	383,517	303,420
Missouri	81,752	47,999
Florida	81,255	47,831
Virginia	25,222	15,809
All other states	63,880	35,700
Total	16,134,930	11,191,820

The estimated production in 1916 will be 11,637,000 bales.

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Special New York Number (March, 1912).

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The Journal of Geography, Madison, Wis.

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The letters M. N. C. on the address label on the wrapper of your magazine mean "Member of National Council of Geography Teachers." If you are a member, please see if these letters appear with your name on the address label. If they do not, drop a card to the Journal of Geography, Appleton, Wis., asking to have these letters added.

Editor.

The JOURNAL of GEOGRAPHY

Volume XV MARCH 1917 Number 7

THE DEVELOPMENT AND PRESENT ORGANIZATION OF ELEMENTARY SCHOOL GEOGRAPHY IN THE UNITED STATES*

By OLIVE J. THOMAS
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THE GROWTH AND DEVELOPMENT OF ELEMENTARY GEOGRAPHY

THE elementary school geography of today is influenced by the ideas of two or three American geographers of the past century, who had for the most part received their stimulus from the great German and Swiss teachers, Ritter and Pestalozzi. The subject matter was slow in developing, and for years was restricted wholly to a ponderous treatise on geography by Jedidiah Morse—the first American geographer—whose first book appeared in 1789; but it was an advanced discussion of little practical value to the child.

W. C. Woodbridge (1794-1845) who had visited Pestalozzi in Switzerland, and who had spent considerable time with Ritter and Humboldt in Germany discussing the problems of geography, was the first to realize the very bad conditions of geography-teaching in the United States, and in particular the lack of a suitable text. Accordingly in 1833 he published a "System of Modern Geography", through which he hoped to make geography a science, though he by no means accomplished his task. He devoted a portion of his book to "Remarks to Inexperienced Teachers", in which he emphasized certain methods in geography-teaching, a phase which Morse completely omitted. Traces of these ideas and suggestions are to be found in the modern methods of teaching, as will be seen later.

Horace Mann (1796-1859) voiced similar ideas. He, too, had visited Europe, and had studied with Ritter at his zenith in Berlin. He describes the geography-teaching as follows:

"The practice seemed to be uniform of beginning with objects perfectly familiar to the child—the school house with the grounds around it, the home with its yards or gardens, and the streets leading from one to another. First of all the children were initiated into the ideas of space, without which we can know no more of geography than we can of history without the ideas of time. Mr. Karl Ritter of Berlin—probably the greatest geographer now living, expressed a decided opinion to me, that this was the true mode of beginning."

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*Prepared at the School of Education, University of Chicago.

Thus, through Woodbridge and Mann Ritter's ideas in practice in Germany were introduced into America in 1843. These leaders were, however, ahead of their time and their influence was little felt. No definite steps were taken to improve geography methods until Arnold Guyot (1807-1884) one of Ritter's best students came to this country, Having taught in Germany and Switzerland and having studied at the University of Berlin, he was thoroughly acquainted with German ideas; and through his influence, first as inspector and institute lecturer of the Massachusetts Board of Education (1848-54) and later (1854) as professor of Geology and Physical Geography at Princeton, the old "place and book" geography gave way to the "physical." His book, "The Earth and Man" (1849), was simply an elaboration of Ritter's work. It was the first attempt at humanizing geography, and emphasized the following points:

1. The forms, the arrangement, the distribution of the terrestrial masses on the surface of the globe, though accidental in appearance, yet reveal a plan which we are able to understand by the evolution of history.

2. The continents are made for human societies as the body was for the soul.

3. Each of the northern or historical continents is peculiarly adapted by its nature to perform a special part corresponding to the wants of humanity in one of the great phases of its history. Thus nature and history, the earth and man, stand in the closest relations to each other and form one grand harmony.

In 1868 Guyot published a book of methods—"Geography Teaching"—in which he attempted to put into practice the theories outlined in "The Earth and Man." Some type lessons were given in which the knowledge and interests of the children were used to develop the fundamental concepts. He advocated that the woods, animals, and the relations of the kind of land to the industries of the people, be made subjects of study.

It is granted today that such a method of instruction is beyond doubt the best, proceeding from the problems that are within the range of experience of the child to other geographical facts emphasizing the thought process rather than the memory —the development lesson.

After studying the inter-relation of the various industries and their inter-dependence, Guyot proceeded finally to the study of direction, distance, globe, continents, and the world. Guyot's text books, however, were not widely used, partly because there were few teachers qualified to use them, and because he, as a university professor, was not familiar with elementary school conditions.

Following Guyot in influence was Colonel Francis W. Parker (1837-1902), president of the Cook County (Ill.) Normal. He was a follower of Ritter also, and had spent three years (1872-1875) in Berlin under the influence of Kiepert, a distinguished pupil of Ritter's and his successor in the University. In his books and teachings he constantly referred to Ritter and often to Guyot. Frye, a pupil of Colonel Parker, carried the influence further, and it is said that his "Elementary Geography" followed the subject and method which might be called Ritter and Parker geography. The same general trend is revealed in the geographical writings of Charles McMurry, though he may have been reflecting German methods also, since he is a graduate of Jena. He emphasizes the industrial side more than the previous authors.

One writer reviews the methods of early geography as follows: "At first there prevailed what might be named sailor geography. The pupil was compelled to memorize all the capes, headlands, etc. . . . He enlivened this to some extent by brief mention of the curiosities and oddities . . . such themes as would furnish good stock for sailors yarns." "Little or nothing was taught to give unity to the isolated details. . . . It was an improvement on this when the method of memorizing capital cities and political boundaries succeeded. With this came the era of map drawing."

Instruction in geography constantly improved with the introduction of new devices "to make plain and intelligible the determining influences of physical causes in producing the elements of difference and the counter process of industry and commerce by which each difference is rendered of use to the whole world, and each locality made a participator in the production of all." (Rept. Comr. Educ. 1893-94, vol. I, p. 504.) Guyot was undoubtedly the dominating influence in producing the changes and in bringing about the improvements.

Probably the most important factor in crystallizing the geography of the elementary grades into a definite and uniform course of study were the reports of the famous Committee o Ten of the National Education Association in 1893, and of th

Committee of Fifteen which followed it. The Sub-committee on Geography was made up of normal and college men such as T. C. Chamberlain and W. M. Davis, Israel C. Russell, and Francis W. Parker. The course of study as outlined by this committee does not differ to any great degree from that followed at present. The course was defined as follows:

1. *Elementary Geography,* a broad treatment of the earth and its inhabitants and institutions to be pursued in the primary, intermediate and lower grammar grades.

2. *Physical Geography,* a more special, but still broad treatment of the physical features of the earth, atmosphere, and ocean, and the forms of life and their physical relations, to be pursued in the later grammar grades.

3. *Physiography,* to be pursued in the later high school, etc.

In recommending this outline of study, the influence of Francis W. Parker, the great admirer and follower of Ritter, as previously mentioned, is clearly seen. The report declared that the arrangement of the work should be largely controlled by the systematic development of the three classes of activities: (1) the powers of observation, (2) the powers of scientific imagination, and, (3) the power of reasoning. The power of observation is necessary to furnish clear, accurate, and realistic fundamental ideas and modes of thought, which in turn are necessary as a ground work for the training of the powers of scientific imagination, which in turn is the only means by which the larger part of the matter of geography can be presented to the mind. Both clearness of observation and strength of imagination are essentials as a basis for safe reasoning. "First see, next reproduce, then study the production of others, and meanwhile ponder and reason on all." The Conference believed that the purposes of these various processes as expressed in the various types of geography were:

1. *Observational Geography*: (1) to develop the habit and power of observation; (2) to give pupils true and vivid basal ideas; (3) to arouse the spirit of inquiry and a thirst for geographical knowledge.

"This work of observation should begin with those features that lie immediately about the pupils; and so fall easily within the reach of their direct study and ready comprehension. . . . Observation should not only begin the work but should continue throughout the entire course of study and beyond. . . . Every opportunity for observational work in geography should be eagerly embraced. . . . Exercises for the special purpose should be made as frequently as possible, formally or informally, in school hours and out of school hours, by classes and by individuals."

The organization of geography in the first three grades practically follows this outline, even today.

2. *Representative Geography*:

"Immediately after the making of observations, should come their reproduction in the form of descriptions, sketches, maps, models, etc. The great end of education is to create productive ability."

In addition, the fourth grade usually includes: (a) elements of industrial geography; the industries of the neighborhood; the natural conditions that permit of the productions of the home region. "Learn how man takes advantage of natural conditions and changes some to meet his needs." (Cf. Guyot.); (b) in some schools a text, "to serve as a reader, and an elementary survey of the United States and North America." At this time attempts are made to aid the children in understanding causal relationships.

3. *Derivative or Descriptive Geography*. Since the pupil's experiences and observations are limited, they must now depend on the observation and work of others. Thus descriptive geography comes to occupy a large portion of the time.

This is commenced in the third grade with geographical "story telling."

4. *Rational Geography*. "This phase of the subject which leads the pupils into the reasons of things, should be assiduously cultivated, for it is the soul of the science."

This broad treatment of the earth was recommended, because it seemed most serviceable to the majority of pupils during the only years when many would remain in school.

"It should deal not only with the face of the earth, but with the elementary considerations in astronomy, meteorology, botany, history, commerce, governments, races, and religions, so far as these are connected with geography. Unless this admixture of subjects is included under the elementary courses of geography, many scholars will not gain a knowledge of even the outline of these important subjects." (Special Report of Committee of Ten, page 204.)

Following these reports a reform movement in geography-teaching spread over the country. Emphasis was placed, however, on the physical side of the subject, due perhaps to the personnel of the Committee. The first text for the grades to be published after the report of the Committee of Ten is reported to have contained 26% physical and mathematical geography, and 42% on the physiography of the continents; thus, about two thirds of the book was devoted to physical geography in which man and his work had only an incidental reference. But it did not appeal to the children. The mistake was soon discovered and the text revised. The pure physiography was reduced to 5%, and the political and commercial maps, which in the first book were placed at the end, regained their proper places, and were allotted nearly double the space. Texts have followed rapidly since, none returning quite to the old type, and yet placing more and more emphasis on the human side. "This is not because the facts of physical geography are less important than formerly, or because they are not an integral part of the subject; it is because children are not interested in such facts, unless they are closely associated with the lives and doings of people. . . . Physiographic facts as a rule, should be associated with their consequences as seen in the lives and doings of the people."

THE PRESENT ORGANIZATION OF GRAMMAR GRADE GEOGRAPHY

In the organization of the curriculum in geography in most schools today, a text is not introduced until the fourth or fifth grade, and here the subject tends to become mainly a memory training. In the state requirements, the work is specified as— - — — 's Geography to page .... for the first half year, and to page .... for the last half. Few observations are made, and too often the upper grade geography degenerates into a list of facts which the pupils recite to their teacher. Many attribute this condition to the unpreparedness of the teachers; for the normal schools, in general, do not provide adequate training for this work.

In many schools the fifth grade studies the world as a whole, while others study the United States, and North America; the sixth, South America and Europe; and the seventh, Asia, Africa, and the Islands. Supplementary readers are widely used. In some instances the study of the various continents is completed in the sixth grade, and in the seventh and eighth the subject is reviewed or restudied with special reference to the physical or commercial side.

PRESENT TENDENCIES

Recently some states have begun to realize that rote learning is disasterous to the development of the geographical point of view of the pupils and defeats the purposes of geography. Hence such suggestions are made as: "In all the work, strive to make it something besides the memorizing of names." "Lead the class to see the effect of climate and soil upon products and industries, and why the large cities have grown up where they are" etc. "Closely correlate geography, history, literature, and language." "Make geography a thought study. Let over half of the questions demand thought rather than memorizing." "Require maps, flat, relief, and production." "Make the study alive." "Emphasize the life of the people."

In the Wisconsin report, a suggestion for preventing memory work in geography is made by calling the teacher's attention to the fact that the text is simply a geographical reader; others may be as good, and assignments should be made from them. Topics, oral and written, should be assigned, and the pupils taught how to use library books. Through the assignments, the pupils may be taugth how to study, and frequent reviews and outlines are recommended so as to organize the material studied.

In many reports, type questions for promotion are given. (See Wis. 1913—p. 207.) Specific data and outlines that the children should know are also set forth, and much of the teaching is guided by these. Year by year new facts and relations have been added until now there is a reaction, a cry that the subject cannot help but be a mass of facts under the present requirements. Accordingly a committee was appointed in Minnesota and its report on the elimination of subject matter in geography as well as in certain other subjects, tends to relieve the situation—at least for Minnesota. The committee believes that "greater emphasis should be given to a study of the United States by industrial divisions or sections, than to a study of the separate states; that the foreign countries should be studied with that degree of emphasis which is warranted by their commercial relationships with the United States; and that current events should receive attention in so far as they pertain to domestic affairs or to our relations with foreign countries." (See the Report.)

SUMMARY

The present status of geography in the grades may be summarized as follows: The primary work consists of a study with special reference to the home geography and its relation to the world, the main object being the cultivation of observationa habits, and the laying of foundations for geographical thinking; the ability to see cause and effect. In the grammar grades however, the subject tends to become cut and dried facts, though the present tendency is to enliven the subject, and to restrict it so as better to meet the needs of the pupils.

RECENT DEVELOPMENT

It might be mentioned in passing, that the Chicago schools have organized their course in the eighth grade into two parts: one half year of geography review, and one half year entitled the "Chicago Course." The content is as follows: (1) Chicago—historical, geographical, and industrial; (2) the social and civic conditions of Chicago; (3) the improvements which are being planned for the betterment of social, sanitary and civic conditions; (4) the Chicago plan; (5) commercial geography of the city.

Miss Baber of the School of Education of the University of Chicago, has been influential in establishing in that institution, a course which, throughout the grades, especially emphasizes the human relationship of geography. The world as the home of man and animals; the control of the land forms on human development; life responses are emphasized, all illustrated by abundant pictures and frequent field trips. The reaction of the children is excellent and the results good.

Thus the tendency is to develop a home geography, and to include the social, historic and geographic influences which tend to mold the environment in which the child lives that he may better appreciate and understand his fellow men and their surroundings. (Compare with Guyot's ideas.)

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Recently some states have begun to realize that rote learning is disasterous to the development of the geographical point of view of the pupils and defeats the purposes of geography. Hence such suggestions are made as: "In all the work, strive to make it something besides the memorizing of names." "Lead the class to see the effect of climate and soil upon products and industries, and why the large cities have grown up where they are" etc. "Closely correlate geography, history, literature, and language." "Make geography a thought study. Let over half of the questions demand thought rather than memorizing." "Require maps, flat, relief, and production." "Make the study alive." "Emphasize the life of the people."

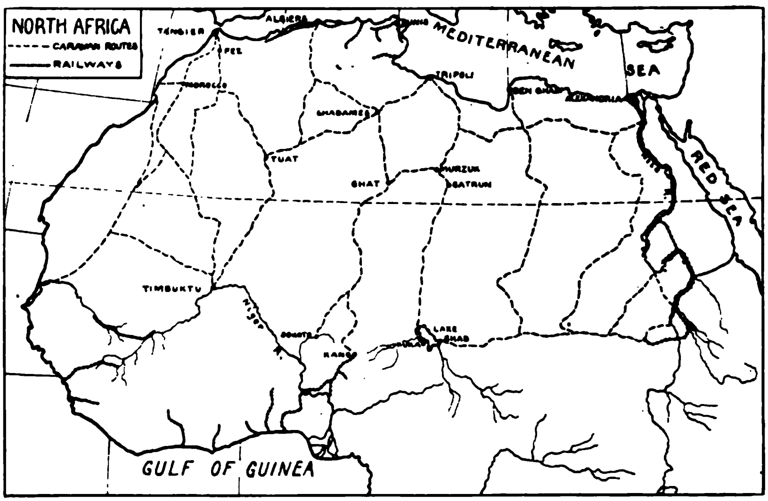
In the Wisconsin report, a suggestion for preventing memory work in geography is made by calling the teacher's attention to the fact that the text is simply a geographical reader; others may be as good, and assignments should be made from them. Topics, oral and written, should be assigned, and the pupils taught how to use library books. Through the assignments, the pupils may be taugth how to study, and frequent reviews and outlines are recommended so as to organize the material studied.

In many reports, type questions for promotion are given. (See Wis. 1913—p. 207.) Specific data and outlines that the children should know are also set forth, and much of the teaching is guided by these. Year by year new facts and relations have been added until now there is a reaction, a cry that the subject cannot help but be a mass of facts under the present requirements. Accordingly a committee was appointed in Minnesota and its report on the elimination of subject matter in geography as well as in certain other subjects, tends to relieve the situation—at least for Minnesota. The committee believes that "greater emphasis should be given to a study of the United States by industrial divisions or sections, than to a study of the separate states; that the foreign countries should be studied with that degree of emphasis which is warranted by their commercial relationships with the United States; and that current events should receive attention in so far as they pertain to domestic affairs or to our relations with foreign countries." (See the Report.)

SUMMARY

The present status of geography in the grades may be summarized as follows: The primary work consists of a study with special reference to the home geography and its relation
world, the main object being the cultivation of obser

Between the larger oases, which determined the courses taken by the caravans, wells are located at intervals to provide water for the passing caravans and "fonduks" or caravanserais have been established. These fonduks are enclosures large enough to accommodate several thousand camels and are made with walls high enough and doors sufficiently strong to protect the caravans from the attacks of the robber tribes of the desert. At the fonduks food is provided for both camels and men. Here, too, the caravan leader may exchange camels—a common occurrence—since it is unusual for one set of camels to make the complete journey across the desert.



The paths of the caravans extend through regions of varied character. In the sandy regions, which make up not more than one ninth of the total area, the tracks of a caravan are soon obliterated because of the constant movement of the sand. It is only the superficial layers which are affected, however; the main lines of dunes do not change their position but remain almost as fixed as mountain ranges.

In other parts of the desert the routes lead over great mesas or through rocky defiles in the mountains. The parts of the trails most easily traversed are those in the part known as the Reg. Here the rock forms a sort of natural macadam. The part known as the Hammada is the most difficult of all to cross. The rock is pudding stone and is so rough that it is exceedingly hard on the feet of both camels and men.

Along some parts of the route the paths made by the camels are sunken to a considerable depth below the general surface level. Where drifting sand quickly obscures the trail, the leader determines his course either by landmarks which would be insignificant to the ordinary observer, or by means of the stars.

The Caravan

The number of camels in a caravan varies from 1,000 to 13,000, the average being about 8,000. Small caravans frequently unite for protection. Camels are obtained from desert tribes who make a business of raising them for caravan use. Caravan owners may either buy or hire the camels which they require to carry their goods.

A caravan is made up mainly of draft camels or "jemals." Each jemal can carry a load of about 300 pounds besides his driver. The drivers, however, ride very little. A jemal travels about 4½ to 5 miles an hour and covers 30 miles a day easily. The caravan usually halts for two or three hours during the hottest part of the day, except when in great need of water or in danger of attack. Long stops are made only at the oases and fonduks.

In advance of the main part of the caravan are men mounted on "mehari" or racing camels. This advance guard can travel at a more rapid rate than the main caravan. It is for the purpose of locating the wells along the route and of preventing surprise attacks.

Perils of the Caravan Routes

The sand storms which occur in the Sahara are greatly dreaded and with good cause. They last from two or three hours to several days. Not only are their direct effects painful but the wind is so drying that it often evaporates the water from the wells on which the caravans depend.

The lack of water is a very serious matter and may result from the drying up of the wells or from the failure of the caravan leaders to locate the wells along the route which he is following. Sometimes it is necessary to kill some of the camels to obtain the blood and the water from the reticulum, thus preventing death from thirst.

Another great danger which besets the caravans which cross the Sahara is that of attack by the robber hordes, of which the most powerful are the Tuaregs. In spite of the fact that caravan owners pay a considerable bounty to the petty rulers through whose territory they pass, they are not secure from sudden attacks by the Tuaregs. Caravan owners sometimes hire bands of Tuaregs to convoy them through territory where the danger of attack is unusually great; but it is not certain that their protection is as effective as it might be.

THE CARAVAN LEADERS

The leader of the caravan is chosen by the man who owns the outfit. Great care is taken to secure a man who is not only honest and trustworthy, but who has the ability to direct the other members of the caravan of which there may be several thousand. It is his business to organize the men so as to secure them, as far as possible, from surprise attacks; in order to do this he has authority over the caravan similar to that of a ship's captain. His knowledge of the route must be complete for the fate of the caravan depends upon his guidance. Salaries as high as $5,000 have sometimes been paid to a leader for a single trip.

NATURE OF THE COMMERCE OF THE SAHARA

The through or trans-Sahara traffic consists of the products of the Sudan on the one hand and of European manufactured goods on the other. The importance of this commerce has never been as great as the accounts of it would suggest and within the last three decades the decline has been so great that the value of goods is at present insignificant, amounting to considerably less than a million dollars annually.

Until the closing years of the 19th century the slave traffic across the Sahara was very important. Since that time the most important articles of trade going northward have been gold dust, ostrich feathers, ivory, and tanned goat skins. Of these products of the Sudan the only ones to reach the United States directly are the goat skins which are sent to New York to be used in the manufacture of gloves and shoes. From the north are brought manufactured goods from Europe, and grain, cheese, and wool from Algeria and Tunis. British cotton goods constitute about half the value of all the south-bound products.

Since the oases along the caravan routes are collecting and distributing as well as consuming points, the local trade is of considerable importance. The desert has a population of between two and three millions which must depend upon the caravans for everything not produced locally. The two chief products of the Sahara itself are dates and salt. From the neighboring regions small caravans bring dates to the oases and exchange them for other caravan transported goods. The movement of dates along the main lines is northward, while salt, which is produced chiefly in the region about Bilma, is carried southward.

From Tripoli two large caravans left for the Sudan each year in former times. The first one started in April, reached Timbuktu about the end of May and remained there until the first of October. The second one left Tripoli early in October and returned early in May. Caravans did not cross the desert during the summer.

Although some of the caravans made the complete journey across the desert from the Mediterranean to the Sudan, not all of the traffic was carried on in this way. At the larger oases such as that of Tafilet and Ghat goods were brought to the annual fairs where merchants from the north met those from the south and exchanged wares.

Decline of the Trans-Saharan Caravan Trade

Since the middle of the 19th century the trans-Saharan traffic has been declining, and especially since about 1890 has there been a marked decrease. During the last half of the 19th century the value of goods declined from 10 or 15 million dollars, to less than 2½ millions. The decline has continued so that it is said to amount to little over half a million dollars at the present time. Tripoli, which at one time was the most important exporting point for Sudan products, now has dates and esparto grass of local origin first in value in its list of exports. The value of both the imports and exports of Tripoli is only about one million dollars and this includes such products as the sponges from the fisheries of Tripoli.

Since the coast to the south and west of the Sudan is the natural outlet for the region, it was to be expected that commerce would be diverted from the trans-Saharan routes. With the establishment of steamship lines to the south coast and the development of railroads in the Upper Niger region the inevitable has come to pass. Caravans crossing the Sahara are fewer in number and smaller in size. Along the Mediterranean the building of railroads in the coast region has put an end to the east-west caravan trade.

The adverse weather conditions, the danger of attack by desert tribes and the heavy expense involved have only hastened a change which was bound to come with the extension of steamship service to the region of the Guinea coast. When it is recalled that a single camel can carry only about 300 pounds it is evident that with a caravan consisting of 10,000 camels, only 1500 tons can be carried, an amount insignificant compared with that which an ocean going vessel can carry; and only equal to a freight train of fifty cars.

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WHAT IS STANDARD TIME?

THE above question was asked in an examination in Geography in a Middle Western State University. The clearness of the answers, given verbatim, is remarkable, especially in view of the fact that practically the only kind of time with which the students have to do is Standard Time.

Standard time is divided up into sections of land. The sections are divided up by the sun.

Standard time is the result of the sun upon the earth.

Standard time is the adopting of a certain regular hour in a given part of the country.

Standard time is time adjusted so as to allow for the rotation of the earth.

Standard time is the way of telling time. It is used in the U. S.

Standard time is the division into minutes and hours of day and night for the sake of convenience.

Standard time is the time acknowledged by the government to be certain time in various parts of the U. S.

SOME MOVEMENTS OF STATE CENTERS OF POPULATION AND THEIR SIGNIFICANCE

By Roland M. Harper
College Point, N. Y.

ALMOST every important invention or discovery, or agricultural or industrial development, or change in environment, is soon followed by a shifting of population toward the region affected by it. To take one of the simplest illustrations, the discovery of America by Columbus in 1492 was felt sooner or later throughout the civilized world; and one reason why the West is more sparsely settled than the East today, and America than Europe, is that an equilibrium between the old and the newly-discovered regions has not yet been reached. Every discovery of useful minerals of course attracts population, as does the discovery or development of crops adapted to regions previously regarded as unpromising agriculturally, and of fertilizing materials to ameliorate sterile soils.

The invention of numerous kinds of labor-saving farm machinery has made agriculture more profitable and the population denser in some semi-arid regions, but at the same time it has decreased the rural population of some fertile and long-settled regions; for as the farmers become more efficient fewer of them are needed to cultivate a given area, and some then have to seek a livelihood elsewhere or in other occupations. Inventions lead to the building of more factories, which are usually in or near cities and thus contribute to the growth of the cities. (The rapid growth of Detroit since the invention of the automobile is a typical case.) The urban population has increased faster than the rural throughout the United States, and in other civilized countries, ever since the first census was taken, and is likely to continue to do so as civilization becomes more complex, in spite of the much talked-of "back to the farm" movement, and various schemes for making farm life more attractive.

New agricultural empires are being opened up by dry-farming methods and by irrigation and drainage projects,* with consequent rapid increases of population; and every new railroad that is built causes a re-distribution of population in its vicinity. If railroads had never been invented the population of the United States would undoubtedly have increased much more slowly.

It seems likely that the increase of population is not a steady and inevitable process, as Malthus supposed something over century ago, when he predicted that the population of the earth would soon be too large for the available food supply, but depends largely on inventions and discoveries. Authorities agree that the human race has increased in numbers in the last 100 years (which is since the time of Malthus) faster than in any previous century*; and this has been precisely the period of the greatest inventions of mankind. As far as we know the number of wild animals and plants of each species, and of savages, would remain practically the same from one century to another, (barring the interference of civilized man), for they do not as a rule invent or discover anything. (Of course with the lapse of ages some animals become extinct and others dominant, but those changes are probably correlated with geological changes of environment as much as with the innate qualities of the animals themselves.)

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*See Bull. Am. Geog. Soc. 47:209-210. March, 1915.

Population may also decrease from various causes, such as the exhaustion of mines, forests or soils, vicissitudes of climate, and calamities of one kind or another. Ellsworth Huntington has shown that many arid and almost uninhabited regions had considerable population a few hundred or thousand years ago, presumably indicating that their climate was once moister. Secular changes of that kind are usually so slow that census returns (which have been used only since 1790) give no indication of them; but sometimes a short series of wet or dry years causes a marked shifting of population, as happened in the Great Plains a generation ago. (This will be discussed below, under Kansas.) In Florida the freezes of 1895 and 1899 gave the orange industry a severe setback and drove many people out of the state.

With these principles in mind, the movements of the center of population in each state, as shown for each of the last four censuses in the Statistical Atlas of the United States published by the Census Bureau in 1914 (pp. 29-34, pls. 119-132), furnish an interesting field for study; for the position of the center responds to every movement of population except a uniform increase. The writer is not yet prepared to explain the movements of population in every state, but perhaps some interested reader can supply information for those cases that are omitted or imperfectly explained. A few cases have already been partly explained in the Statistical Atlas.

In Alabama the center of population has remained ever since 1880 within a few miles of the geographical center of the state, in Chilton County. This probably indicates that the great industrial developments in the Birmingham district have almost exactly counterbalanced the migration of farmers toward the sandy pine lands (discussed by the writer in the October number of this journal). Another point to be considered is that there is considerable sandy land in the northern half of the state, outside of the pine-barrens proper, which has felt the stimulus of fertilizers, and the pine-barrens in the south are above the average of the whole pine-barren region in fertility, and therefore have not responded so conspicuously to applications of fertilizers as has been the case in Georgia and Florida.

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*See articles on Malthus and on Population in any good encyclopedia.

In Arkansas, too, the center, a few miles northwest of Little Rock, has moved very little, but since 1890 its trend has been southeastward, probably on account of the attraction of the largest city, Little Rock, and also on account of drainage operations in the alluvial lands in the southeastern quarter of the state.

In California the center has moved southeastward in thirty years from a few miles west of Stockton to a few miles west of Fresno, at the phenomenal rate of over three miles a year. The development of the Imperial Valley and other arid regions in the south is doubtless largely responsible, and that in turn has been facilitated by improved methods of making concrete dams and aqueducts.

In Connecticut the center, though remaining within a few miles of Meriden, has moved steadily southwestward, probably on account of the growth of the manufacturing cities in that quarter of the state.

In Delaware the movement has been even slower, but steadily northward, the attraction doubtless being Wilmington, the largest city, which now contains over 40% of the population of the state.

In Florida the movement has been generally southwestward from the richer toward the poorer lands, but in 1890-1900, the decade of the two severe freezes, it moved almost directly westward, away from the orange-growing regions.*

In Georgia the center has been throughout the thirty years in Jones County, near the geographical center, but the movement in each decade has been southeastward toward the pine-barrens, whose development since 1880 with the aid of German potash, Chilean nitrate, and Florida phosphate was described in the October number. (In the last five years there has been considerable agitation in favor of removing the capital from Atlanta to Macon, which is very near the present center of population.)

In Illinois the center has moved in a general northeasterly direction about a mile a year, from near Bloomington to near Pontiac; Chicago evidently being the magnet.

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*See Geog. Review, 2: 361-367. Nov., 1916.

In Indiana the center of population instead of moving toward Indianapolis has steadily receded from it in the direction of Chicago, probably on account of industrial developments around the south end of Lake Michigan, and agricultural developments in the sandy lands and Kankakee marshes in the same quarter of the state.

In Kansas in 1880-1890 the center moved westward about 25 miles, evidently on account of a few years wetter than usual in the semi-arid western portion of the state, which caused a vast migration of farmers in that direction. But normal climatic conditions soon returned, making successful farming on the Plains almost impossible, and the boom collapsed about 1893. In 1900 the center of population was nearly back to where it was in 1880, but by 1910 the westward movement was again in progress, more slowly than before, but with a surer basis of irrigation in the valleys and dry-farming on the uplands.*

In Kentucky and Maryland there have been no striking developments in the last thirty years, and the centers of population have not moved much. The same might be said of Massachusetts, where although the increase of population has been rapid, chiefly on account of manufacturing, it has been pretty uniformly distributed.

In Michigan the influence of the automobile industry in Detroit is perceptible in the last decade.

In Mississippi the movement of population has been southward toward the pine-barrens, as in Georgia, and at about the same rate.

Missouri shows a southerly and southeasterly migration, probably correlated at least in part with drainage operations in the alluvial region in the southeast, as in Arkansas.

The movement of the center of population in Nebraska has been similar to that in Kansas, and doubtless for the same reasons.

In Nevada the center has moved rather erratically, probably in response to mining developments.

In New York the prevailing movement has been southward, mostly in the direction of the largest city. (See Brigham, Geog. Review, 2:209. Sept. 1916.)

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*For a comprehensive account of the rise and fall of the great wave of immigration in western Kansas and contiguous territory see W. D. Johnson on The High Plains and their Utilization, in part 4 of the 21st and 22nd annual reports of the U. S. Geological Survey, 1901 and 1902.

In North Carolina the center has been in the western half of Chatham County for 30 years, but has moved always westward; the growth of cotton and furniture manufacturing in the Piedmont region apparently outweighing that of agriculture in the pine-barrens.

In Rhode Island the center has moved slowly but surely toward Providence, at the rate of about 229 feet a year.

In South Carolina there is less contrast in soil fertility between the Piedmont region and the coastal plain than in either of the two adjoining states, and consequently the effects of the discoveries of fertilizing materials in the second half of the last century have been less marked. The center of population has been within a few miles of Columbia during the three decades, but has moved slowly northwestward, doubtless on account of the development of cotton manufacturing in the Piedmont.

Tennessee, like its neighbor Kentucky, has shown very little shifting of population. The movement in 30 years has been eastward, however, perhaps on account of agricultural developments on the sandy Cumberland Plateau as much as anything else.

Things have apparently been pretty quiet in Vermont, as in New Hampshire.

In West Virginia the center of population has been moving steadily southwestward, possibly on account of the opening of new coal mines in that direction.

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EDITORIAL

ECONOMIC GEOGRAPHY IN THE HIGH SCHOOL

AS a high school study, commercial or economic geography is growing notably, while physical geography is declining. The movement to introduce general science means that a considerable number of small high schools must displace some other science, usually physical geography, in order to make room for the new General Science. If the outworking of this movement shall result in bringing into the high schools a *thoroughly creditable* type of economic geography, the change will perhaps be no loss to geography, or to the high schools. In the larger schools physical geography will remain as an elective, as it probably will in most of the smaller high schools.

For years commercial geography was not favored by thoughtful school men because it appeals mainly to the pupil's memory and develops the judgment and reason but little, and th statistical side of the study is generally over-emphasized. The question now is,— Can economic geography be so presented that it will be an efficient instrument of education? That it will be so presented in a majority of cases is not so sure.

The pupil's attitude of mind toward any study is a matter of importance. If he believes that the study which he is pursuing will benefit him in his life work, he attacks that subject more aggressively than if he does not see any practical value in it. Unfortunately, most young people are inclined to estimate the value of a study according to its probable usefulness in gaining a livelihood. Commercial geography appeals to many students because it has in it the suggestion of money-making.

Our school boards and school directors are yielding to the tendency of the age to emphasize vocational and practical studies at the expense of purely cultural or disciplinary ones. Whether this trend is fortunate or unfortunate remains to be seen, but the trend is nevertheless strong and persistent. This being the case, the question is squarely before the geographers of the country,— Can we so organize economic geography that it shall be more than a mere "practical" study?

Certain cautions must be observed: (1) Statistics must be reduced to a minimum. (2) We must avoid *long* lists of productions, manufactures, exports, and the like. In the case of most countries it is necessary to speak particularly only of the productions in which the country is a *leader*. If the general climatic conditions of a country are understood, pupils may simply learn that the country can and does produce in larger or smaller quantity the crops characteristic of that climate, but that it specializes in a few things and furnishes these in large quantity to the world's trade. For example, Great Britain manufactures hundreds of articles, but her manufacturers specialize in a few lines; notably cotton, steel, wool, and ships. In the case of Germany a similar fact holds true. The Germans manufacture in greater or lesser quantity nearly everything that Americans and English manufacture, but they have attained leadership in a few items such as dyes, chemicals, beet sugar, and scientific apparatus. The French have attained a similar leadership in silks, velvets, laces, embroideries, and other high-priced textiles, and in wines and articles of ornament. Denmark is a splendid example of efficiency in specialized and cooperative agriculture. Holland is a great mercantile nation whose rich colonies in the East Indies supply valuable commodities to the Dutch merchants, and whose position at the mouth of the Rhine, gives the Dutch exporters and importers an advantage in mercantile operations; Holland's foreign trade is greater than that of Russia. Belgium, with its coal and iron, has made a record as a manufacturing nation, especially in the manufacture of iron and steel. Norway, with its bleak mountains and indented coast, has attained a high reputation for its seamen. So it is with nearly every nation; while it does a great variety of things very much like other nations, it usually does a few things in a superior way. These are the things which deserve emphasis. If this emphasis is properly placed the different countries come to have an *individuality* in the pupil's mind. He thinks of them as possessing special and interesting traits and each country comes to have a personality.

Economic geography should consist, in part at least, of practice in sizing up the various commercial nations of the world, in appraising them, so to speak; in gaining an appreciation of their agricultural and mineral resources, the peculiar genius of their people, the strength or weakness of their government, the efficiency of their education, their nearness to other countries whose trade is profitable, their access to the sea or lack of it, their defense against enemies, etc.

The study of the geography of different countries should be somewhat like the study of the character of important figures in history. We try to ascertain what qualities in Washington, Franklin, and Napoleon, made them great among men. So we note that certain countries like Germany and Great Britain and France possess qualities which make them great among nations. Our study of geography should be an effort to evaluate these elements of greatness in the different countries and to discover why they bulk large in the world's affairs. Sometimes the most important elements in the nation's life are geographical, but it would be a mistake to ignore non-geographical elements if they are of fundamental importance. For example, no one considers that the German nation is what it is simply because of its geography. Undoubtedly its geographical position, surrounded by potentially hostile nations, wedged in between rivals if not enemies, has stimulated the people to greater activity and preparedness than would otherwise have characterized them. Nevertheless, German efficiency and thoroughness of organization are matters which have been instilled into the German nation by the leaders of thought within the nation. Any satisfactory study of Germany, therefore, requires a consideration of the genius of the German people, of the French people, of the Swiss, of the Japanese, and so on throughout the list. If economic geography shall include this sort of character-study of nations, it will be one of the most valuable studies in the curriculum. Every educated person desires this sort of knowledge. Every man who shall be raised to leadership, in a small way, or a large way, will appreciate having received this sort of instruction.

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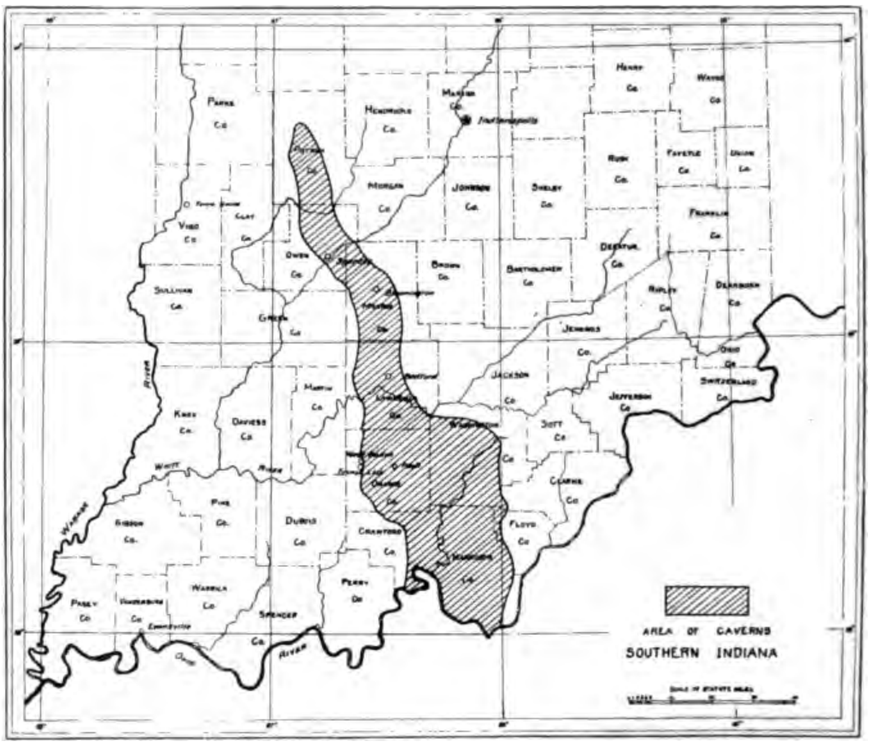
AREA OF CAVERNS IN SOUTHERN INDIANA

THERE are many caverns in southern Indiana. The greater number and most important are in the counties of Crawford, Harrison, Orange, Washington, Lawrence, Monroe, and Owen. These counties are underlain by 250-350 feet of limestone. The caverns have been formed by underground water which dissolves the limestone along lines of underground drainage and carries it away.



The solution of limestone along a line of underground weakness or drainage usually results in a cavern that is very long in comparison with its width. Some of the caverns are more than a mile in length and are much like railroad coaches in a train. That is, the caverns consist of rooms joined by narrow passages. Some of the rooms are very large. A room in Wyandotte Cave, known as the Hall of Representatives, is 100 x 60 feet with a ceiling 35 feet high. In order to visit all the rooms of this particular cave one has to travel almost 5 miles. Not all of the many caverns are large. From the dimensions mentioned above they range in size down to mere crevices in the limestone.

To name all the larger caves or caverns of this region would be almost useless here. Wyandotte Cave in Crawford County is second in size in the United States. (Mammoth Cave, Kentucky, is first). But for great halls, columns, and domes, Wyandotte Cave is not excelled by any known cavern in the world.

In some of the large caverns the drainage system is so extensive that the streams become brooks ("underground rivers") flowing from pool to pool. The pools of water are often described as "lakes." Both plants and animals which are found in the caverns have adapted themselves to the underground conditions.

In going across the cave region one can see many kettle-shaped depressions known as sink holes. Some sink holes are only a very few feet across while others are many rods in diameter. The sink holes are due to the solution of limestone near the surface.

M. K. Davis.

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SMYRNA AND ASIA MINOR

SMYRNA is not only the chief port in the Levant, but it is also the gateway to Asia Minor. In spite of the fact that this region was the cradle of ancient civilization, almost as little is known about certain parts of the interior as of Abyssinia or Tibet. The city of Smyrna has about 400,000 inhabitants, half of them Greeks. Camel caravans, mosques with their towering minarets, cypress groves and the picturesque costumes of the people generally, give it a distinctly oriental character.

Before the many wars in which Turkey has been engaged during the past few years became a disturbing feature, considerable commerce was carried on with the United States through the port of Smyrna. Asia Minor is a virgin country. Before the Italian-Turkish war of 1911 the capitalists of England, France and Germany began to turn their attention that way. The German campaign began about 1888 and was followed up with energy and profit. Before the present war broke, German capitalists had loans in Turkish securities amounting to $293,000,000.

Chief among the natural riches of Asia Minor are the vast forests which cover the interior mountain ranges of the country. In the Vilayet of Smyrna, for example, there are 1,600,000 acres of valuable woodland, which comprises nearly one-eighth of the entire vilayet or province. In the Vilayet of Adana there are 1,200,000 acres of forest. Immense quantities of the best timber are consumed annually throughout Asia Minor in preparing charcoal, and, much to the detriment of the climate and soil what is chopped down is never replanted. On the shores of the Black Sea the coalfields of Heraclea form an actual source of vast potential wealth to the Turkish Empire. The beds extend along the shores of the Black Sea for nearly forty miles and run inland, coming to an apex at Angora, a distance of nearly two hundred miles.

The coal, though lying in very thick seams, contains too many impurities for it to compete successfully with English coal, except after being hand-picked and screened. Before the war there was only one company with a washing and screening plant, and this limited the output to some 600,000 tons per annum. There is no reason why, with increased washing and picking facilities, this coal could not entirely replace the imports. In other parts of the empire there are also deposits of mineral oil, but want of proper communication with the outside world has thus far rendered it impracticable to exploit them. Should the plan of Sir William Willcocks ever materialize—namely, to irrigate the fertile plains of the Tigris and Euphrates and make them as productive as they were when the cities of Babylon and Nineveh were at the height of their power—Turkey might become one of the great cotton and grain producing countries of the world. Even in the Province of Smyrna nearly two-thirds of the land remains uncultivated.

Generally speaking, the methods of tilling the land of Asia Minor are still very primitive. In many respects but few changes have been made since ancient times. It is only in recent years that Turkish farmers and large land owners, for example, have begun to relax somewhat in their attitude toward modern innovations. Formerly they were satisfied with small returns sufficient for their own use. The number of those busily engaged in agricultural pursuits in the Vilayet of Smyrna may be placed at half a million, of which two-thirds are Turks and one-third Greeks. The Mohammedan peasants are partly domiciled and partly nomads and shepherds. The domiciled Turks are honest and industrious, devoting their attention to tilling the soil. The nomads and shepherds, on the contrary, wander from place to place with their herds, often squatting on the property of others, from which they are difficult to eject.

The Greek peasants are also industrious and intelligent. As the mountain ranges and districts along the seacoast inhabited by them, together with the islands of the Archipelago, are too dry, on the whole, for the planting of cereals on an extensive scale, the Greeks mostly turn to raising goats and cultivating vineyards. The Greek peasants in the Symrna Vilayet usually have a comfortable little home in some one of the country villages. The farms in the Vilayet of Smyrna consist of large estates (tschiftlicks) and small peasant holdings. As a rule the houses consist of two rooms only, one above known as the harem, which has lattice windows and is surrounded by a veranda, and the other below, which serves as a kitchen and dwelling place generally. These rooms are characterized by large fireplaces, in which food and coffee are cooked, and straw mats and carpets stretched out before them, upon which the occupants of the house recline at will. The room decorations are meagre, as pictures of any kind in Turkish households are very rare, and chairs, beds and other substantial pieces of furniture are only just beginning to be used in a few dwellings in each Turkish village. In every Turkish village there are one or two mosques.

Flax, hemp, and tobacco are cultivated somewhat systematically on the large estates. The farmer in the district of Smyrna usually divides his fields into three categories, namely, that which is set apart for spring sowing, fall sowing, and that which is left entirely uncultivated as pasturage for live stock. On such farms as have no modern plows a part of the earth remains unturned, which means that in a climate like that of Smyrna, where dampness exists from the middle of November until the middle of March, the roots of the growing grain become choked by weeds. The harvest is cut with scythes, and the peasants still use the most primitive methods of threshing. Horses and oxen tramp upon the sheaves until the grain is completely separated from the straw. Sesame, beans and flax are not threshed with a flail, but with sticks. Indian corn is not systematically tilled as in the United States, but scattered over the field without any regard to rotation. It is grown only for fodder, and not allowed to ear, nor is it probable that it would ear under such conditions of cultivation.

Naturally the future of Smyrna and of Asia Minor depends very much upon the outcome of the present war. No lasting result can be achieved in that country unless something substantial is done to guarantee the safety of person and property. The lack of this, more than anything else, has kept the country back in the past. Brigandage must be thoroughly stamped out and the law courts must be reformed, so that both the native Turk and the foreigner residing in that country may get justice. Radical changes along these lines will open up to international commerce one of the richest countries in the world.—[Excerpted from *The Americas* for Dec., '16.]

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THE WORLD'S PETROLEUM

NO one realized in 1859, when the first oil well in the United States was bored on Oil Creek, Pennsylvania, that a new industry had been started, which in fifty years would revolutionize the world's method of obtaining light, heat and power.

Petroleum is probably second to no other mineral in its importance to the well-being of mankind. Sixty years ago more than half the world lived a large part of its night hours in darkness for want of a suitable light. The ordinary kerosene lamp is one of the great inventions of the world, because of the great service and benefit it has been to mankind in every quarter of the globe.

The usefulness of petroleum, however, is not confined to lighting the world. For some time it has been used as a fuel on both sea and land. Most of the vessels on the Pacific coast of America and on the Caspian Sea and Volga River, and many of the railroads in California, Mexico and Russia use fuel oil.

Few realize that the world is in the midst of a revolution as radical as that which transformed the industries and commerce of the nineteenth century. While coal and steam will not cease to be used for fuel and power, they will nevertheless be less important than during the last century. The internal combustion engine, in which oil is used as a source of power, is taking the place, not only of the engine in which the steam is produced by the use of coal, but even that of steam engines in which the steam is produced by fuel oil. A pound of petroleum used in a Diesel engine will propel a vessel as far as three pounds in a turbine, or four pounds in an ordinary steam engine.

Mineral oils are divided into two broad groups. The light oils, such as come from Pennsylvania and Rumania, which are rich in paraffin, are said to have a paraffin base and are known as paraffin oils. The heavy oils, such as are found in California, Mexico and Russia, which have an asphaltic base, are known as asphaltic oils and are the principal source of fuel oils.

From 1859 to 1915, 6,017,000,000 barrels of oil were marketed and the annual foreign trade in it in these later years amounts to upwards of $500,000,000. Of this output, the United States produced 60 per cent, and Russia 28 per cent. The Dutch East Indies, Galicia, Rumania and Mexico each produced about 2 per cent, and all the rest of the world about 3 per cent.

The following table shows the progress of the world's production of petroleum by decennial years, and also that of the leading producing countries.

World's Production of Petroleum

Barrels of 42 gallons each

Year	Total	United States	Russia	Rumania
1860	508,578	500,000	....	8,542
1870	5,799,214	5,260,745	204,018	83,765
1880	30,017,606	26,286,123	3,001,200	114,321
1890	76,632,838	45,823,572	28,691,218	383,227
1900	149,132,116	63,620,529	75,779,417	1,628,535
1910	327,615,503	209,557,248	70,336,574	9,723,806
1915	426,892,673	281,104,104	68,548,062	12,029,913

Mexico, 1915, 33,000,000 bbls. Dutch East Indies, 12,000,000 bbls.

From the above table it will be seen that since 1860 the United States has been the leading producer in each decennial year, except 1900, when Russia produced one-half of the world's output. The Dutch East Indies do not appear until 1900, and Mexico not until 1910, while Rumania, although producing as early as 1860, did not become important until 1910. The increase in the production, and therefore of the consumption, has been very great. In 1915 the United States produced nearly twice as much as all the rest of the world.

The Five Oil Fields of the United States

There are five important oil fields in the United States:

1. The old Appalachian oil field which was for many years the main source of supply and includes western New York, western Pennsylvania, West Virginia, eastern Ohio, Kentucky and Tennessee. In this section there has been a great decline. Pennsylvania and New York, which produced 33,000,000 barrels in 1891, only marketed 9,000,000 barrels in 1915, and the whole region, which produced 36 million barrels in 1891, only marketed 24 million barrels in 1914.

2. The Ohio (Lima), Indiana and Illinois oil fields. Some of these oils had a large quantity of sulphur, but that difficulty has been overcome. Nevertheless, there has been a falling off in the production of this region, from 37,000,000 barrels in 1907 to 27,000,000 in 1914.

3. The mid-continent field, including Oklahoma, Kansas, Colorado and Missouri. This section produced 22,000,000 barrels in 1906 and 85,000,000 barrels in 1915, mainly in Oklahoma

The oil of this region is of a very high grade and from it large quantities of gasoline are made.

4. The Gulf field, along the coast of Texas and Louisiana, produced 36,000,000 barrels in 1905, but fell off to 13,000,000 barrels in 1914. These oils contain asphalt as well as sulphur and are somewhat similar to the Russian oil.

5. The California field, producing oils that are black, viscous and asphaltic. Most of it is used for burning under boilers and large quantities of it are exported to Europe. The production in this field is rapidly increasing, reaching 100,000,000 barrels in 1914. The output declined in 1915 to 89,000,000 barrels, largely because of the overproduction in previous years and consequent discouragement of production. The California and the mid-continent fields are the most likely ones to show large increases in the future.

Russia, Mexican, East Indian and Rumanian Fields

Russia is the second largest producing country, with an output in 1915 of 68,000,000 barrels, nearly all of which is obtained from wells on the Caspian Sea. In 1915 the wells in the Baku region produced 80 per cent of the output, and Grosny, also on the Caspian, 15 per cent. Baku oils are asphaltic and most of their output is marketed as kerosene and fuel oil.

Mexico, which only produced 220,000 barrels in 1904, had an output of 33,000,000 barrels in 1915, and this despite the fact that some of the wells were not operated owing to the unsettled condition of the country. It is estimated that if all the wells which have been sunk were permitted to flow to their full capacity, the total production would be 150,000,000 barrels. The most important wells are near the Gulf coast and Tampico and Tuxpam are the chief shipping ports.

The Dutch East Indies produced 12,000,000 barrels in 1915. Of this, 58 per cent was produced in Borneo, 30 per cent in Sumatra, and 12 per cent in Java.

The United States exports more than all other producing nations combined. The exports of mineral oil during the fiscal year ending June 30, 1916, amounted to 58,000,000 barrels, or about twice as much as in 1906.

Of all the different kinds of mineral oil exported from the United States, that of illuminating oil is the most widely distributed, for kerosene from the United States is preferred above all other, especially in the Far East. Of the 1,157,000,000 gallons exported in 1914, 710,000,000 gallons were to Europe; 272,000,000 gallons to Asia; 70,000,000 gallons to South America; 39,000,000 gallons to Oceania; 34,000,000 gallons to Africa, and 29,000,000 gallons to North America. The decrease of 335,000,000 gallons in 1916 was mainly in the trade to Europe, which fell off 280,000,000 gallons.—[Excerpted from article by John J. Macfarlane in *Commercial America*, Oct., 1916.]

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RECENT PUBLICATIONS

OCEANIA—A SUPPLEMENTARY GEOGRAPHY. James F. and Arthur H. Chamberlain. Macmillan Co., 1916. 160 pp. 55 cents.

This little volume is the last of the series entitled "The Continents and Their People." It deals with a region of intense interest and certainly of unique character. The aims of the book is "to show in an interesting manner, the relationships between human life and its environing conditions, and to adapt the material to the ability of the pupil." The first part of the purpose has been attained, while the second part can only be positively realized after children have used the book.

It is a bit unfortunate that this Reader is not quite up to the high standard set by the other books in the series. Even the mechanical make-up of the book is somewhat lacking in quality. This however, may be due merely to the scarcity of good materials at present.

More exact references to maps and photographs would be very desirable. The use of the term "Torrid Zone" might well be eliminated in preference to "Tropical Zone."

It is regrettable that the book could not be somewhat larger in number of pages in order that more space could be devoted to Australia, to the Philippines and to the Hawaiian Islands. It is to be hoped that the authors will some day write a book on Australia alone and another on the rest of Oceania.

The style is good; the poetry here and there adds variety. In spite of the few adverse comments above, it may well be said this book rounds out a series worthy of merit.

EUGENE VAN CLEEF.

THE SMALL GRAINS. By M. A. Carleton. xxxii+638 pp. Diagrams, illustrations, bibliography and index. The Macmillan Company, New York, 1916. $1.75.

An agricultural text for college students by a cerealist in the United States Department of Agriculture which merits the attention of geographers. In this book we have an expressed recognition of the importance of teaching to agricultural students the geographic conditions which under-lie crop production and distribution both at home and abroad. The importance of geographic factors was emphasized by Hunt in his Cereals in America. Mr. Carleton has gone a step farther and has given his readers not only a list of favored soil and climatic conditions for each grain but also a brief association of the local geographic conditions with the production of cereals in each important region of the world. Other phases of cereal culture of interest to geographers are discussed under the chapter headings Cereals Under Irrigation, Uses of Cereals and Cereals in Commerce. The literature of agriculture is full of incidental geographical material but seldom is it so intentionally put in the fore-ground or so carefully organized as in this recent publication.

V. C. F.

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NOTES

The Journal of Geography is pleased to announce to its readers that Mr. George G. Chisholm, widely known economic geographer of the University of Edinburgh, Scotland, has accepted an invitation to act as contributing editor for the British Isles. Mr. Chisholmn takes the position on our staff long filled by the late Professor A. J. Herbertson of Oxford.

It is also a pleasure to announce that Professor Walter N. Lacy of the Anglo-Chinese College at Foochow, China, will act as contributing editor for China. Our readers have already had two short contributions from Professor Lacy in recent numbers of the Journal.

We have also added to our staff during the past year, Professor A. P. Brigham of Colgate University; Professor C. J. Posey of the University of Minnesota; Professor E. J. Saunders of the University of Washington, and Professor A. E. Parkins of the Peabody Teachers College, Nashville, Tenn.

Rand McNally and Co., Chicago, announce the appointment of Professor William H. Mace of Syracuse University as editor of educational texts. Professor Mace is probably better known to the teachers of history than to the teachers of geography, for his writings have been in the historical field. He brings to his new work a wide and successful experience.

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NOTICE

We desire to have the letters M.N.C. appear on the address label of each subscriber who is a member of the National Council of Geography Teachers; and so we ask again that any member, who does not find M.N.C. on the address label on the wrapper of his magazine, notify at once the Circulation Manager of the *Journal of Geography*, Appleton, Wis.

The JOURNAL of GEOGRAPHY

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THE WEATHER FACTOR IN THE GREAT WAR*

VI. AUTUMN AND WINTER, 1916

By Robert DeC. Ward
Harvard University, Cambridge, Mass.

The Western European War Zone

THE outstanding fact during the autumn and winter of 1916 was the marked control exerted by the wet and stormy weather which is the normal characteristic of those seasons in western Europe. Day after day, in spells of a week or more at a time, the soaking rains, wet snows, or dense fogs forced a practical suspension of important military operations, although local fighting was kept up. The first snow fell along the western front in the middle of November. When aviators cannot fly; when artillery cannot find its objective; when the men cannot move out of their trenches, a practical standstill is inevitable. Aviators must be able to locate enemy positions, and their signals must be visible to the artillery commanders. The latter must be able to follow the results of the firing. And the ground must be dry enough for the infantry to leave their trenches and to move as quickly as possible across the zone which is exposed to the enemy's artillery attacks. Trenches and shell craters filled with water deep enough for men to drown in are difficult, if not hopeless, obstacles in a line of advance, as are also swollen rivers and flooded lowlands. When the ground is soft, many shells fail to explode, simply burying themselves in the moist soil. In "fighting weather", i. e., when the ground was dry or frozen and the sky was fair, active operations were always resumed, the gunners "smiling at the stars", as one despatch put it, and the aviators rejoicing in better flying weather. When, owing to storm, or cloud, or fog, observations are impossible, artillery firing has to be done by "dead reckoning," and is relatively ineffective.

It was officially announced early in the autumn that the British and the French would continue the "battle of the Somme" during the winter. It is interesting to note that both Major Gen. F. B. Maurice, chief director of Military Operations at the British

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* Previous articles in this series have been published as follows: *Popular Science Monthly*, Vol. 85, Dec., 1914, 602-613; this *Journal*, Vol. 13, Feb., Mar., 1915, 169-171, 209-216; Vol. 14, Nov., 1915, 71-76; June, 1916, 373-384; Vol. 15, Nov., 1916, 79-86.

War Office, and Gen. Sir Douglas Haig, made emphatic reference to the part which unfavorable weather conditions played in checking the Allies' offensive. On Dec. 28, Major Gen. Maurice frankly confessed that bad weather had halted the Allied operations on the Somme, and expressed the hope that they might be resumed in March. "Never having held the same line in any other Winter, we underestimated the effect of the fog. There have been frequent frosts, not severe enough to harden the ground, but sufficient to form fogs, making artillery observation fire practically useless." And in his report covering the period July 1—Nov. 18 (Dec. 29) Gen. Haig said that the German western armies were only saved from a decisive defeat by a protracted period of unfavorable weather which prevented the Anglo-French forces from taking full advantage of their successful advance. "Poor visibility seriously interfered with the work of the artillery and constant rain turned the mass of hastily dug trenches into channels of deep mud. The country roads, broken by countless shell craters, rapidly became impassable, making the supply of food stores and ammunition a serious problem. These conditions multiplied the difficulties of attack to such an extent that it was impossible to exploit the situation with the rapidity necessary to enable us to reap to the full the advantage we had gained." Again, on Jan. 11, Gen. Maurice reported: "It must be remembered that both climatic and ground conditions along our front are much worse than in any other section in the west. Just now we feel this acutely, as the water is always near the surface in Flanders, and besides the churned up ground on the Somme front we must contend with adverse weather." All this was to be expected, and no considerable movements will be undertaken until the spring sunshine and clearer and more settled weather dry up the "everlasting sticky mud" of northern France and Belgium; make possible the most effective use of artillery, and the rapid transfer of troops and supplies.

The approach of colder weather brought calls for thicker clothing; for more hot drinks, and more hot food. The gunners warmed their hands on the heated gun barrels. Trenches were dug deeper and made more snug, and there was an added spur to the efforts of the Allied troops to capture the German dugouts, which were carefully prepared and are well warmed. To overcome the difficulty of securing dry fuel, the German soldiers are provided with waterproof combustibles—bundles of sticks saturated with bitumen and interspersed with strips of celluloid with shavings. This fuel can be in water one minute and ablaze the next. The frequent rains and generally rather mild weather along the western front have made some waterproof covering desirable in place of the too heavy overcoats of the French soldiers. Hence the popularity of the American rubber army poncho as a substitute. The British "tanks", of which but little has been heard during the past few months, have doubtless proved too heavy for use in the deep mud of autumn and winter along the western front.

It may be that one reason why Holland, in the face of much provocation, has hesitated to enter the war at this time, is that her canals, which are her main line of defense, were frozen and could not be used for flooding the necessary districts (Press despatch, Feb. 24).

THE EASTERN EUROPEAN WAR ZONE

Large-scale, major operations were not to be expected during the severe winter along the eastern front. This was clearly seen last year. It is true that the marshes freeze in severe cold, but they are always more or less treacherous, and large armies cannot with safety count on passing over them. In spite of all the handicaps resulting from the cold and the winter snows, there has been considerable activity of a minor sort, and several times when the marshes were solidly frozen the Russians made spirited attacks, keeping up their reputation of being the best "cold weather fighters" in Europe. The Siberian troops have especially distinguished themselves. In extremely severe cold there was generally a cessation of fighting. Snowstorms were several times taken advantage of for making surprise attacks, and rivers were easily crossed on the ice. In the mountain passes of the Carpathians, snow fell as early as Sept. 20, 1916. Four feet of snow were reported in some localities on Oct. 23. On one occasion (Jan. 12) the Germans drove poisonous gases through a hose against the advancing Russians, but the wind was unfavorable, and the new device failed. On another (Feb. 24), the wind shifted during a German gas attack, and drove the poisonous fumes back to the German trenches.

THE BALKAN CAMPAIGN

September to November are generally believed, by military authorities, to be the best for campaigning in the Balkans. Nevertheless, many difficulties have been met with on account of the weather. The autumnal rains (1916) gave considerable trouble. Mackensen's army was in a very precarious situation at the end of September, when heavy rains ruined the roads and cut off his supplies of fuel and munitions. The rise in the Danube, after a thaw, gave the Germans trouble in late November. Bad weather, fogs, torrential rains and swollen rivers have hampered the operations of both armies in Macedonia. The Germans evidently made every effort to crush Rumania last fall, before the winter checked operations, so that they might be freer to meet the expected "spring drive" of the Allies. It was essential that Gen. von Falkenhayn should hasten his advance across the mountains on the Rumanian-Transylvanian border before weather conditions became impossible. As it was, "bitter cold," deep snows, rain, sleet and fog provided many hardships. At the end of November, Gen. von Falkenhayn is reported to have said that the length of the Rumanian campaign would depend largely upon the weather. Continued spring-like weather might hasten the end, whereas one sharp cold spell might lengthen it materially.

Weather was, perhaps, one element in delaying a general advance of the Allied troops from Saloniki. An extended winter campaign by the Allies in the Balkans would have been ill-advised.

The severe winter weather of the eastern Balkans was a constant and important factor in the military operations there. "Bad weather," fog, flooded rivers, impassable marshes, blinding snowstorms, severe cold, often hampered the opposing armies but on the whole favored the defense by delaying the German advance, which, however, progressed with remarkable success. Severe cold, freezing the marshes around Galatz, greatly facilitated the enemy's approach to that city. In spite of all the climatic handicaps, the Balkan campaign was surprisingly active during the early part of the winter. A general condition of immobility chiefly due to the weather conditions, was, however, gradually reached, here as on the other fronts. Germany doubtless profited by the fact that weather conditions negatived large operations on the other fronts to effect a considerable concentration of her troops in Rumania. With the coming of better fighting conditions in spring, the pressure on all sides of the "iron ring" will increase, and concentration in one field will be impossible for Germany. The greatest difficulties have naturally been encountered in the Balkan mountains, where deeper snows, and greater cold (well below zero) very greatly increased the labor and the sufferings of the troops, and resulted in a slackening and not infrequently in a cessation of operations. It became almost impossible to use artillery. Many of the German prisoners were found to be wearing only "very thin summer clothes", and deaths by freezing were not uncommon. The need of securing wool to make uniforms for her millions of men fighting in cold climates has doubtless been one of Germany's most pressing problems. On several occasions, the German soldiers wore white clothing to make themselves less conspicuous while advancing over the snows.

Much has been written about the Rumanian harvest as a source of supply of grain for the German invaders. Agriculture in Rumania, where the rainfall is comparatively light, is of a "dry farming" type. Unless sowing is done early in autumn, or late in spring, there is much danger to the crops on account of the cold and the lack of moisture. There are thus difficulties in the way of the Germans securing any considerable new supply of grain in Rumania during the present year.

THE AUSTRO-ITALIAN WAR ZONE

In the Alps of the Trentino and on the Carso plateau, autumn and winter make important military movements impossible. Heavy autumnal rains; winter snows many feet deep in the mountains; thick clouds and fog; "terrible winter weather"; avalanches; "hurricanes"; especially in the higher mountains,—are often mentioned in the official despatches. The soldiers have used skis. The Italian entrenchments have been lined with straw and boards; and special provision has been made for supplying hot rations to the detachments of troops on the higher peaks. Blankets, woolen underclothing, fur chest protectors and fur sleeping bags have been provided for the Italian army.

On at least one occasion (Feb. 12) galleries dug under the snow were used as a means of approaching enemy trenches.

THE RUSSO-TURKISH WAR ZONE

Autumn cold was reported as setting in in Turkish Armenia in mid-September, with considerable snow in places. Severe snowstorms in the Caucasus have, as last year, delayed the troops. Snow reaching "a man's height"; cold well below zero, and snow falling "for twenty days" have been reported. With the beginning of winter cold, desertions among the Turks increased considerably.

THE MESOPOTAMIAN CAMPAIGN

Mesopotamia is one region where fighting is easier in winter than in summer. On Sept. 14 the British Army, which had been inactive for several months on account of the intense heat, began to resume operations. We learn also that immense supplies of munitions and food were sent forward along the Bagdad Railway during the dry summer months, before the winter ("subtropical") rains made the road impassable. Rains, coming, as was to be expected, in late December, temporarily hampered the movements of the British troops. Late in February heavy rains brought the Tigris to flood level, and made it difficult to move troops. It is clear that, if possible, the British should advance to Bagdad and seize the end of the railroad before hot weather really comes on.

THE CAMPAIGN AGAINST THE SUEZ CANAL

It was not generally expected that the Turkish troops could cross the Sinai Desert, for an attack on Egypt, during the heat of the summer. But the task was accomplished in July and August, 1916, although without a successful outcome. The men were transported on camels. For the guns, small parallel trenches were dug, to fit the wheels of the gun carriages. These trenches were filled with scrubby plants, and in some places where the sand was too loose and deep for the track, planks were laid lengthwise under the wheels.

THE WAR IN AFRICA

Few reports come to us from Africa, but enough is known to make it clear that the British troops there, including Boers, East Indians, and South African blacks, have had desperate struggles. Steady torrential rains; deep mud; tropical jungles, combined to give the unhappy troops more than their full share of hardships.

THE WAR AT SEA

The only naval engagement of note occurred in the North Sea on Jan. 22, this being the first time the naval forces of Great Britain and Germany have met since October, 1915. That weather conditions played some part in this combat is evidenced by the fact that the German ships left their naval base "under cover of a heavy fog."

THE WAR IN THE AIR

The Germans continued to choose spells of foggy weather for their Zeppelin raids on England, but the system of searchlights in use there has greatly reduced the chances of an air raider getting as far as London, even in weather favorable for such an attack. It is reported now that Zeppelins prefer a fair westerly wind, because, if they are struck, they can drift back with little power. On the Continent, strong westerly winds on the Somme front, blowing "for three weeks", in one case, drifted the Allied machines far over the enemy's front, and compelled them to return slowly against the wind. Occasionally an engagement has been fought in which the artillery fire was not "aerially controlled", i. e., when, on account of unfavorable flying conditions, there were no aerial observers to direct the fire. A super-Zeppelin was wrecked in a storm on Nov. 21, while on its first trip.

(Dated March 1, 1917).

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SHIPBUILDING IN THE UNITED STATES, PAST AND PRESENT

By L. B. Krueger
University of Wisconsin, Madison

Prior to 1850

SHIPBUILDING is one of the oldest industries of our country. It was one of the first great manufacturing industries in the American colonies. By the middle of the eighteenth century and for a long time thereafter more people in New England were engaged in shipbuilding and navigation than in agriculture. Circumstances forced the people of New England to become in a large measure a maritime people. Blessed with the wealth of the sea and with an abundance of shipbuilding material, the early settlers did not take to agriculture, for which the soil and climate were ill-adapted, but became fishermen, ship builders, sailors, and traders. Fishing became an industry of fundamental importance and along with it grew and developed the ship building industry.

During and just following the Revolution, ship building suffered a slight relapse but, nevertheless, remained an industry of high rank down to the Civil War. Shipbuilding and navigation go hand in hand and up to the middle of the nineteenth century we were the world's great shipping nation. From the year 1795 to the year 1850, approximately 90 per cent of our foreign commerce was carried in American ships. At this time the tonnage of the United States was nearly one-third of the entire shipping tonnage of the world. It is estimated by some authorities that our merchant marine in 1850 was more than fifty per cent in excess of that which would have been required to carry all the exports and imports of the country.

The Decline

With the Civil War our supremacy in shipbuilding and navigation ceased. This great conflict came at a critical time in the history of the industry,—at the time of the transition from sail to steam and from wood to iron. Heretofore, Americans owed their supremacy in shipbuilding to the fact that they built ships of better model and greater speed. The clippers and packet-boats then built in America had the reputation of being the finest and fastest boats of their time. This was to a very large extent due to the fact that we had a natural advantage in the tall, straight, white New England pine which made it possible to build a boat which would virtually clip or cut the water, hence the name clipper. America's supremacy in this respect was at the same time a factor in her undoing. The momentum of our success in building wooden ships caused us to continue building these vessels fully a decade after England, soon to be our great rival, had gone over to the construction of iron steam ships. Then, too, and more important, the British enjoyed a comparative advantage in the construction of iron vessels. Necessity had forced England to utilize her resources of iron and steel at an earlier date and thus her manufacturing industries, based upon steel, were well established before our iron and steel industries had begun their great development. Various other factors led to the decline of the industry.

The Civil War was destructive to our commerce. We were only well entered upon the railroad era and the invention of agricultural machinery had opened the Middle West to the most enterprising; furthermore, the development of our West offered splendid opportunities for the investment of capital. The shipbuilding industry has suffered from well-intended but unwise legislation; the net result being that since the Civil War it has declined very greatly in importance.

UNSUCCESSFUL EFFORTS TO RESTORE OUR MERCHANT MARINE

The loss of our prestige as ship-builders has been a matter of deep chagrin to many Americans and for the last half century or more much effort has been expended toward the development of a merchant marine, but without avail. Certain laws have been passed with a view to aiding the industry. First, it has long been a governmental policy to grant American registry only to American-built ships.* Secondly, the coast-wise trade has been reserved exclusively for American-built ships; and thirdly, the liberal patronage of the government in building the new navy in private yards has been of value in keeping the largest of our shipyards modern and up-to-date.

The first policy, that of granting American registry in foreign trade only to American-built ships, has been of questionable benefit. It has been instrumental in driving our merchant marine engaged in foreign commerce off of the high seas. For certain economic reasons, iron and steel vessels could be built more cheaply abroad than in the United States, and it therefore became the practice for American shipping companies to purchase foreign-built ships, and of course these had to be registered and sailed under a foreign flag. This legislation had a detrimental, though indirect effect on the shipbuilding industry just following the Civil War. It is held by many that a Free Ship policy at that time, pending the development of our own iron and steel industries, would have kept our merchant marine on the high seas and thus indirectly have aided the shipbuilding industry. Until a few years ago the cost of American built ships ranged all the way from 15 to 40 per cent over costs of similar vessels built in British and German yards. The chief reasons for the difference are as follows: (1) until recently, steel plates could be made more cheaply in Great Britain and Germany than in our own country; (2) higher labor costs in American yards; (3) and most important of all in British yards shipbuilding has become standardized. Americans lead the world in their standardized and systematized factories, but in this industry we have been beaten by the British. Our shipyards have had to build vessels for special purposes on the Great Lakes, western rivers, for the coast-wise trade and for government survey purposes; this is given by many as an important reason why we have not reduced the manufacture of ships to type, as have the British.

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* By the provisions of the Panama Canal Act of 1912, as amended Aug. 18, 1914, any foreign built vessel may be admitted to American Registry.

The Present Revival.

In spite of the rather sad experiences of the ship-building industry during the last half century, it is now experiencing a period of the most remarkable prosperity. In July, 1914, just before the war in Europe began, there were under construction in the United States twelve ocean-going merchant vessels. In March, 1916, three hundred merchant vessels were under construction, and in addition seventy government vessels are also being built. In all 370 vessels of 1,300,000 gross tons are being built in ship yards of the United States* This is regarded by many as being the most remarkable growth ever experienced in industry.

Reasons for Remarkable Activity of American Yards

The reasons for this unprecedented prosperity are several. The first and most important cause is the shortage of merchant vessels for foreign commerce. This is directly due to conditions imposed by the war. In August, 1914, the total merchant marine of the world in round numbers amounted to 50,000,000 tons. Of this it was estimated by one writer* that nearly 40 per cent of the previously existing merchant marine of the world has been withdrawn from service as ocean carriers. His estimates are as follows (in tons):

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* Mar., 1916, *Int. Marine Engineer Mag.*, pp. 112.

		Total 50,000,000
Destroyed	5,000,000	
Commandeered by the British	9,000,000	
Commandeered by other belligerents	3,000,000	
Interned, Teuton allies	4,400,000	21,400,000
Leaving in the merchant service		28,600,000

The result has meant a marked shortage in merchant ships, followed by an enormous increase in freight rates. For example, the increase in the rate of wheat since the war started has been 900 per cent (4c to 40c); on flour 500 per cent, and on certain other provisions 400 per cent. With the world's great merchant marine practically removed from the high seas, this means unprecedented prosperity for American shipping interests, and a great demand for merchant vessels which has resulted in certain leading American yards doubling their capacity, with orders on hand for two or more years ahead.

OUR SHIPBUILDING DISTRICTS

Ship building in the United States is largely confined to three important districts; along the Atlantic; in the vicinity of the Great Lakes, and on the Pacific coast.

The principal yards are still located on the fresh water bays and rivers along the Atlantic coast. Important yards are located at or near Bath, Boston, New York, Philadelphia, and Hampton Roads. New England has lost her former prestige in ship building, due to several reasons. In recent times there has been a marked tendency toward the construction of vessels of large size. A large vessel means cheapness relatively, in construction and in operation it means a relative reduction in overhead charges, and in insurance rates. It is said that the large vessel never lacks for freight, since the larger the boat the cheaper the rate can be made. Hence vessels have become larger and larger, and New England plants have one by one been forced to close or move southward; they did the latter in order to come into closer proximity to iron and steel supplies.

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* H. L. Aldrich, Pres. Aldrich Pub. Co., *Int. Marine Engineer Mag.*, 1916, pp. 483.

The New England Yards.—Since the advent of the steel and iron vessel, New England has been at a disadvantage also with respect to climate. The large ocean-going vessels are mostly built out of doors or under huge sheds, and the frequent rains, snows, and cold weather, characteristic of the New England climate, resulted in vexatious lay-offs and at times interfered with the efficiency of the men. For the above reason New England today possesses only two important centers of ship building; on the Kennebec in Maine there are five comparatively small plants, the largest of which is the Bath Iron Works. These yards are engaged mostly in the construction of small vessels, yachts, torpedo boats, and schooners, in which speed is an important factor. The other plant, The Fore River Shipbuilding Company, is at Quincy, Mass., just outside of Boston; it is one of the leading ship yards in the United States. It has built some of our finest battleships and is modern in every respect.

In the Middle Atlantic States.—The most important plants in the country are located in the Middle Atlantic States adjacent to the sources of iron and steel. The Delaware is sometimes called "the Clyde of America." On its east bank at Camden, N. J., is located the New York Shipbuilding Company, which at the present time has under construction the largest amount of tonnage of any plant in the United States (28 vessels aggregating more than 200,000 gross tonnage). Across the river in North Philadelphia is located the famous Cramp Shipbuilding Company which has been a pioneer among the large shipyards of our country. This plant has built many historic vessels, all of which in their day marked distinct advances in steel ship construction. Other important plants on or near the Delaware are the Chester Shipbuilding Company at Chester, Pa.; the Harlan and Hollingsworth Corporation, located at the same place, and the Pusey and Jones Shipyard at Wilmington, Del.

Aside from the Maryland Steel Company at Sparrows Point, the only other important plant in the Middle Atlantic is the Newport News Shipyards and repair plant at the mouth of the James River, Chesapeake Bay. In the amount of tonnage under construction this plant ranks third in the United States, but bids fair to outstrip any other plant in the country. It is adjacent to deep, fresh water, a factor of great importance, since salt water is injurious to the hull of the ship. It is adjacent to cheap land and has plenty of room for expansion. It is favorably located with reference to the principal raw materials, namely, iron, steel, and coal, and it has an advantage in climate since its operations are interfered with to only a slight extent by cold weather. Largely, in response to these natural advantages, this yard has had a rapid growth in recent years and will undoubtedly continue to hold an important place in the shipbuilding industry.

On the Great Lakes.—Ship building in the vicinity of the Great Lakes is also important. The American Shipbuilding Company, whose principal plant is at Cleveland, Ohio, owns or controls ten separate yards for building and repair work, and has frequently ranked among the three or four largest producers of tonnage in the world. Aside from the Cleveland plant it owns or controls plants at Chicago, Lorain, Buffalo, Detroit, Milwaukee (2 plants), Superior, and an important branch at Port Arthur, Canada's great grain port on Lake Superior. Another concern of considerable importance is the Toledo Shipbuilding Company on the Miami River. All the Great Lakes vessels which are so large that they cannot leave lake waters, are built by these companies. Neither of these concerns is confined solely to the building of lake vessels, but are diversified to a large extent, constructing vessels for Atlantic coastwise trade, tramp steamers, and survey vessels for government service.

On the Pacific Coast.—Within recent years ship building on the Pacific coast has experienced a remarkable development. Modern first-class yards are located at San Francisco, Los Angeles, and Seattle. Prominent among the shipyards of this district is the Union Iron Works, located within a few miles of San Francisco. It is now constructing nineteen large steamships, aggregating 179,000 tons, which in amount of tonnage under construction places it second among the shipyards of the country. Other important plants are the California Shipbuilding Company, located at Long Beach, Cal., the Seattle Construction Company, and the Willamette Iron and Steel Works, the latter plant being the most important yard of the Columbia River District. The latter place is experiencing a remarkable revival of wooden shipbuilding, due to the fact that this region is unfavorably located with reference to iron and steel supplies, but very favorably located for timber supplies; and ship owners can't get steel vessels built in sufficient haste. A wooden vessel is completed in about one half the time of a steel vessel, and for about one half of the first cost. The location of this industry (wooden ship construction) is governed by the timber supply and consequently wooden vessels are now being constructed in larger numbers in other sections of our country; for example, along the Maine coast and at certain small but established yards in the Carolinas and Florida.

FUTURE OUTLOOK

The question might now well be asked, Does the future hold in prospect sufficient business to warrant the continuance of the present boom in American shipbuilding? It has been pointed out that the present situation is the outcome of conditions created by the war. If this is true we may expect that when the war ceases the shipbuilding boom will shrink again to proportions more nearly normal. Several factors may be involved in the shrinkage. First, the demand for war materials will cease and the demand for supplies will be reduced. Secondly, the interned vessels of Germany and Austria will be released to again take their places as ocean carriers. Thirdly, the vessels taken over by the British government as auxiliary cruisers will again be made part of the merchant marine; and lastly, the shipyards of Great Britain will be released from their obligation to build solely for the government and hence will again be in a position to enter into active competition with American yards.

In this case as in every other it is difficult to prophesy. At least it is difficult to predict the future more than two years in advance. Within this period it seems reasonable to assume that the industry will continue in its present high state of prosperity, if such it may be called. We may expect that for at least two years after the ending of the war the leading shipyards of the world will be busy replacing destroyed vessels or else repairing those that have greatly deteriorated; and it is quite certain that the nine million gross tons now commandeered by the British government will be largely antiquated or worn out by the time the war comes to a close.

But what about the situation when hostilities finally cease? Prior to the war, Great Britain was the recognized leader in ship construction and had been for many years the chief source of supply for the navies and merchant marines of many foreign countries. Her leadership in this respect is well explained by the following sentence taken from a well known text in Economic Geography*: "England's leadership during the latter part of the nineteenth and early part of the twentieth century is due partly to cheaper raw material, partly to cheaper labor, partly to abundant capital, and the desire to invest in ships, and partly to the economy which comes from the great size of the industry." The foregoing sentence suggests many of the disadvantages under which American yards have been operating for a half century or more.

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* J. Russell Smith, Industrial and Commercial Geography, p. 574.

With the cessation of hostilities, however, many of these advantages will have been removed to a large extent. We are no longer at a disadvantage with respect to ship plates. Since 1910 ship plates have been as cheaply manufactured in the United States as in England. It is doubtful also whether wages in Great Britain will ever again be as low as they were before the war. The desire to invest in ships will undoubtedly remain, since the shipping industry is so vital to the continuance of Great Britain's colonial policy; however, it is questionable whether or not Great Britain's abundant supplies of capital will give her the advantage she had before the war.

With reference to the great size of the industry and the large scale operations a few words may be said. The better organization and integration of the British yards goes far toward explaining the leadership of Great Britain. However, it is significant to note here that we have attained complete integration in the case of one American plant. The Bethlehem Steel Company now controls four of the largest American shipyards and now controls the entire process from the mining of ore to the launching of the completed vessel. Also with the recent increase in the capacity of our yards we have to a larger extent than ever before attained the large scale production which has been characteristic of British shipbuilding. Even granting that when conditions again become normal, Great Britain will continue to have an advantage in some respects, it seems evident that American shipbuilding has entered a new era, and will in the future occupy relatively a more important place than before the present war.

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A CORRECTION

The Editor.—The March number of the Journal of Geography contains one statement which I would like to correct. In the article upon Petroleum excerpted from "Commercial America" the Mid-Continent Field is credited in 1915 with a production of but 85,000,000 barrels of crude petroleum. This falls far short of the production from Oklahoma alone. The Mineral Resources of the United States for 1915 places the marketed production for Oklahoma alone at 97,000,000 barrels, and that of the entire Mid-Continent Field at over 123,000,000 barrels.

E. J. C.

THE RESOURCES OF CALIFORNIA

By M. G. Edwards
University of California

TO the mind of the average tourist the word California calls forth visions of flowers and big trees, of superb automobile highways through rugged mountain-passes or through endless orange groves, of seared, brown hills, of national parks and of 300 days of sunshine. California in the popular mind is a huge playground wherein work and worry form only inconsequential dust-spots in the whirlwind of expositions, pageants, and carnivals.

The average tourist is justified in these impressions. But he minimizes or has never been made to realize California's position with reference to the material things of life, to its development along economic and industrial lines. Since pioneer days the state has looked eagerly to the prosperity of the future. Now that this prosperity has been in a measure attained, it becomes momentarily retrospective. It looks back over the years of the past, compiles statistics of progress and calls the attention of the world to its almost unparalleled advance during the few years of its active history and of the undoubted prosperity which is to follow.

According to the annual business and trade review of a leading San Francisco paper, the year of 1916 was the banner year in the history of the state, with the exposition year surpassed in every line of industry. The following paragraphs summarize in round numbers the first available statistics for the year's production.

Contribution of California in 1916

California contributed during 1916 a billion and a quarter dollars to the wealth of the nation. Half of this was in primary products; half of it was in manufactures. This total represents $450 for every man, woman, and child within the state, or $2,250 for every family, counting five in a family. This prosperity is founded upon the productions of the soil and represents permanent economic growth.

The billion and a quarter dollars are attributed to the following fundamental sources:

Products of soil and minerals	$ 622,854,000
Manufactures	635,713,200
	$1,258,567,200

The separate sources of soil and mineral products are apportioned as follows:

Orchard products	$130,500,000
Vineyard products	21,300,000
Farm products	124,040,000
Other field crops	67,450,000
Dairy products	45,630,000
Poultry products	20,000,000
Farm animals	40,000,000
Other farm industries	8,700,000
Fish industry	16,200,000
Forest and lumber products	30,000,000
Mineral products	119,034,000
	$622,854,000

FOREIGN TRADE

Business done through the port of San Francisco made enormous expansions during the year, reaching a total of $240,000,000 as compared with a total of $163,000,000 for the preceding year. Of this total, exports amounted to from 120 to 125 millions and imports reached 115 to 120 millions. War conditions were no doubt responsible for much of this increase as shipments to Japan, Asiatic Russia and Australasia showed enormous gains. But a part of it must be attributed to friendlier relations with the western coast of South America. Exports to European countries decreased due to a scarcity of steamers and to various embargoes and trade restrictions. San Francisco was given direct communication for the first time with the Dutch East Indies by service provided by the Java-Pacific Company, under Dutch control. Extraordinary development of trade with the Dutch East Indies is the inevitable result. Five large cargo steamers are now making regular runs between San Francisco and Java, via Japanese ports, Hongkong, and Manila.

SHIP-BUILDING

An industry which is showing remarkable expansion on the western coast at present is the ship-building industry. Two companies located on San Francisco Bay have under way thirty-five steamers with an aggregate of 210,628 tons. This comprises fifteen per cent of the merchant steel ship building in the United States. If the construction that is now in progress in the ship yards of Portland and Seattle be included, this percentage will be doubled.

The story of ship-building on San Francisco Bay is a story which reads like fiction and in which there may be found considerable romance. The industry suffered many reversals and fluctuations during its short history and only recently seems to have become a firmly established and thriving institution. As early as 1849 many small wooden boats were constructed to satisfy the local demand. During successive gold rush periods, large sailing vessels of eastern ancestry, attracted by the boom, arrived in the harbor with valuable cargoes. Lacking cargo and crew for the return voyage, they took up local trade and caused a temporary cessation of ship building.

In 1865 the *Del Monte,* the first ocean going vessel, was built; it was a side-wheeler, 130 feet in length. There followed a revival of the industry for many years. In 1868, fifty-seven wooden ships were built and in the following year ninety-two were added to the fleet. The introduction of the steel hull again caused a decline until recently there came another active period in the building of wooden ships, due to the cheapness of the wooden hulls compared with the cost of the steel ones, and to the belief that for certain trades the wooden hull satisfies all requirements. The Union Iron Works of San Francisco was the first concern to attempt steel ship-building on the Pacific Coast. With the source of raw material 3,000 miles away it was against heavy odds that the company overcame the early difficulties until the recent boom found it equipped and prepared to meet the demand.

MINERAL PRODUCTS

California has been the scene of numerous fanciful tales based upon mineral exploration and discovery. But fact is now prepared to verify these tales with little discredit to their imaginative progenitors. A recent statistical bulletin compiled by the California Bureau of Mines presents official figures which are more reliable and comprehensive than any others that have ever been published.

Forty-nine mineral products contributed to the wealth of the state during the year and only two of the fifty-eight counties failed to supply some product. The total value was $96,663,369, a total which was exceeded only by Pennsylvania, West Virginia, Illinois, and Ohio, whose mineral wealth is largely attributed to their enormous coal and clay products. California was the only producer of borax, chrome, and magnesite; it led in the production of gold, tungsten and platinum, and was second to Oklahoma in the petroleum yield.

Petroleum is responsible for fifty-five per cent of the state's mineral wealth, with a production of 91,146,620 barrels, valued at $43,503,837. Its value for the year 1916 is estimated to exceed this figure by $6,000,000. The proven oil land of the state covers 120 square miles of which sixty-nine per cent lies in Kern County (immediately north of Los Angeles Co.). The other producing counties are Fresno, Orange, Santa Barbara, Los Angeles, Ventura, and Santa Clara (all south of San Francisco). The gas production for 1915 had an official value of $1,706,480. For 1916 it is believed to exceed $4,000,000. Unfortunately an appalling amount of this product has been allowed to go to waste through neglect and carelessness.

The value of metal production was $34,577,214 attributed in order of importance to gold, copper, zinc, quicksilver, tungsten, silver, lead, manganese, antimony, platinum, and iron. Gold, which comprises sixty-five per cent of the total in point of value, is mined in thirty of the fifty-eight counties with Amador County (west of Sacramento) holding first rank. There were 237 underground gold mines in operation which produced 61.64 per cent of the total gold yield. Of the placer mines, fifty-eight were dredging propositions, ninety-six were hydraulic mines, seventy-two were surface or sluicing mines and sixty-one were drift mines.

It is about the gold fields of California that the atmosphere of romance lingers most persistently in the popular mind. Jewelers and gem fanciers are quick to take advantage of this fact. For many years gold quartz has been extensively displayed as one of California's characteristic gems. A specimen with a matrix of white quartz through which gold is distributed in stringers or disseminated grains has an artificial value as an ornamental stone for which jewelers often pay one-third more than the value of the gold contained in the specimen. From this material a vast assortment of ornaments is made and these find a ready sale among the tourists.

Copper is mined in twenty-five counties with Shasta County easily in the lead. Its value in 1915 was $7,169,567 but it is believed that the 1916 figures will exceed $10,000,000.

Zinc, once regarded as a nuisance in the copper districts and despised in general by the mining profession, has come to be regarded with considerable favor. The production in 1915 was valued at $1,617,383 with an average price per pound of 14.2 cents, as compared with a price of 5.1 cents in the previous year. The value of the 1916 yield is estimated to be nearly $3,000,000 with Shasta County as the leading producer.

California has produced quicksilver since 1824 and at present supplies about eighty per cent of the nation's yield.

Quicksilver prospects are scattered widely over the state. An attempt was made some years ago to develop a prospect in a basement on Golden Gate Avenue within the city limits of San Francisco. In 1915 the value of the metal produced was $1,157,449. This figure was increased during the past year to about $2,000,000.

Of the other metals, tungsten has a bright prospect of attaining a position of importance. Prospecting was greatly stimulated during 1915 resulting in many new discoveries of wolframite, hubnerite and scheelite. Although the 1915 yield amounted to only $1,005,467 it is confidently believed by the producers that this figure approached $5,000,000 last year. Silver is mined as a by-product of gold, silver, copper, and lead ores. Platinum is obtained as a by-product of placer operations by the gold dredges. The large iron ore reserves which are known to exist in Shasta, Madero, and San Bernardino counties are as yet unavailable on account of the lack of an economic supply of coking coal. This deficiency will be ultimately overcome by the introduction of electric smelting or by the use of petroleum.

Of structural materials cement is of dominant importance although the state is well supplied with brick clays from which a wide variety of brick is manufactured. Granite, marble, sandstone, and slate occur in considerable quantities. The total value of the structural materials in 1915 was $13,459,047 of which cement claimed forty-five per cent.

Not to be scorned as an important source of the state's revenue is the tourist trade to which all classes of people openly cater. An average of 300 first class passengers are estimated to arrive in the state daily during the winter season. On the assumption that each first class tourist spends twenty dollars a day during his stay in the state, hotel men have given an estimate of $30,000,000 for the coming season as the income contributed to the state's wealth from this source. This is equivalent to the value of the combined gold and copper production of the state for the same length of time.

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THE MAY JOURNAL OF GEOGRAPHY

The May issue of this magazine will be an especially valuable one. It will consist of a classified list of geographical material that can be obtained free or at small cost. Twice before Miss Mary Booth has prepared such a list for the JOURNAL and each has been most cordially welcomed by teachers. Practically the entire May number will be devoted to this purpose. Many teachers who are not subscribers will want a copy. Send cash with order (15c per copy), to The Journal of Geography, Appleton, Wis.

MATHEMATICAL GEOGRAPHY IN THE GRADES

By C. G. Stratton
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IN spite of the fact that there are numbers of excellent books and manuals available, this subject is often poorly handled by grade teachers. In many cases the matter is made worse instead of better by the antiquated outlines provided by supervisors. It is extremely difficult to lead even mature students to an adequate conception of the world in space. This suggests the enormity of the offense of attempting to teach young children, in a formal manner, the complex relations of the earth and the heavenly bodies.

Observations of the Sun

In the grades this work should be almost entirely observational. Throughout the year, in some of the lower grades, a record may be kept of the direction of sunrise, the direction of sunset, and the position of the sun at noon. The last may be done by recording the length of the shadow cast by some post or pole. In the upper grades the angle may actually be measured. A record may be kept of the number of hours of daylight, and the figures compared with those given in the almanac. These observations should be made once or twice a month for the entire school year. In the latter part of the year a little questioning will lead pupils to see that winter is due to shorter days and a lower sun, while summer results from longer days and higher sun. This is more than most eighth grade pupils know about the subject. It is useless to try to go further in the lower grades and it is of doubtful value in the upper. If the globe is used for purposes of illustration, its use should come after the observations are nearly finished and even then it should be used no more than is necessary.

Avoid such terms as *vertical rays, direct rays,* and *slanting rays.* The terms *high sun* or *low sun* are much better. It is not necessary to speak of rays at all. *Sunshine* is a more common term and is the one the child uses and understands. Do not teach that east is the direction in which the sun rises. It is not generally true. Teach that north is the direction in which the noon shadow points or that north is the direction of the north pole of the earth, which is almost directly under the pole star.

Observations of the Moon

A series of observations should precede any explanation of the phases of the moon. Starting with the new moon, observe each evening its position, its shape, and the direction in which the horns point. Note its apparent daily motion and its changes in shape and position from evening to evening. Observe for two or three months, as often as the moon may be seen in the evening or morning, and then try to explain the phenomena observed, using the globe but little. This is entirely too difficult for the lower grades. Eclipses offer no additional difficulties and may be explained at this time. It is often possible to have pupils observe an eclipse of the moon. The nodes of the moon and the explanation of low moon and high moon better not be mentioned in any of the grades.

THE IMPORTANCE OF ACTUAL OBSERVATIONS

A globe or some other spherical object may be used profitably only to help explain the problems arising from observation. Trying to explain earth relations by means of the globe, unaided by observation, is as futile as relying on the text. In one case the child thinks in terms of the globe and in the other he tries to visualize the diagrams in the book. In neither case does he get any conception of the earth in space. Having pupils represent the sun, earth and moon, and run about each other to illustrate the motions of the spheres is always highly interesting to the school. Children are humanly amused by the ludicrous and enjoy that form of play; but unless preceded by a long period of observation, it is without value and is probably a waste of time in any case. It would generally be considered poor pedagogy to direct a pupil to imagine himself to be a maple tree and then have the other pupils study him in order to discover the habits of the maple, especially if the school ground had maples in plenty to which no attention had been paid. But this surely would be no worse than the common practice of disregarding the sun, the moon, and the stars while trying to learn their secrets from a paste-board globe or by walking around a candle. Before allowing children to impersonate birds or trees it is customary to have them observe the habits of real birds and real trees. Why not look at the real sun and the real moon?

Such of the planets as are visible early in the evening may be pointed out and a series of drawings made showing the planet and a few of the adjacent fixed stars. If the drawings are made with some care, the pupil will soon discover that the planets actually move while the other stars do not have a visible motion. In the case of Jupiter a good pair of field glasses will reveal the moons, and their movements may be noted a few evenings. The names of all the planets and their relations to the earth may now be taught with some assurance that at least part will be remembered. In some schools, where there are groups of bright, eager students, it would be profitable to observe the annual retrogression of one of the major planets and the behavior of Venus and Mercury, which never achieve a very great angular distance from the sun. Any explanation of the problems arising from these observations involves a vision that is perhaps beyond the present abilities of many teachers who have received their instruction by the globe method.

By observing the Big Dipper or any other of the northern constellations it is easy to discover that the constellations appear to revolve about the pole star once each day. Children may be led to see that this is caused by the same motion of the earth that causes sunrise and sunset. By observing once or twice a month *at the same time each evening* it will soon be noticed that they appear to make a little *more* than one complete revolution each day. As a result all the stars rise and set a few minutes earlier each day than they did the day before. This apparent westward drifting of the stars may be observed in all the constellations and is sufficient to make one extra revolution per year. It may be possible for upper grade pupils to see the reason for this in the other principal motion of the earth, its annual journey around the sun. But observe *first;* explain afterward, using the globe only to explain the phenomena observed.

TRAINING THE POWERS OF OBSERVATION

If the foregoing seems difficult to the teacher, it is only because we are so little acquainted with nature and have lost the faculty for observation which we all, as children, once had. It is not half so difficult as trying to see the causes of the north and south migration of the sun in the inclination of the axis of a paste-board globe to the plane of a table in a schoolroom. Children are *interested* in the phenomena of nature. In the case of adults, who have for years been led steadily away from nature into the realm of books, the powers of observation often become so inactive that no pleasure is taken in learning from nature. Such people think all knowledge derived from books. This is perhaps the fault of early training in the grades, in high school, and sometimes even in college. It is a great misfortune that our schools so often reverse their proper function by leading children farther away from nature instead of nearer to her.

Teachers who have not a sufficient grasp of mathematical geography to comprehend the apparent movements of the heavenly bodies would do well to restrict their efforts to observation alone and work *with the children.* Such teachers might accomplish much more than better equipped ones who depend wholly on a previously acquired store of information. Any teacher may learn a few of the prominent constellations and the myths concerning them. These myths never fail to arouse interest, and they open such a treasure-house of folk lore and fable that children will be anxious to continue the work, even without the help of the teacher.

Evidence of the inefficiency of the old methods, unfortunately still prevalent, is found in the profound ignorance of the young people entering our higher institutions of learning, concerning mathematical geography. Further, a class of normal school seniors, after putting two weeks of indoor work on the relations of earth and sun, proved, in a simple test that they had learned nothing. And they were perfectly excusable. The serious thing is not that they failed to learn in that way, but that they rebelled against taking the trouble to make the simple observations afterward required. They lacked the power to *observe* and regained it sufficiently to make intelligent observations only after weeks of suggestion.

The heavens present a field for observation as rich as the realms of plant and animal life and should be as little disregarded. In this respect we highly civilized people are far inferior to the ancients or to barbarous people of the present time. The wonders performed in astronomy by the Chaldeans and Greeks were largely the results of study with no other help than the naked eye. They had not even the simplest telescope.

Supervisors often deplore what they call the ignorance of teachers regarding the commonly known and easily understood facts of mathematical geography. The truth is that some of these facts are neither commonly known nor easily comprehended. An understanding of the earth in space is one of the grandest conceptions permitted to man. It is the result of thousands of years of observation and conjecture. It is not arrived at by any person in one lesson or in one year. It must come as a *growth* through a period of years. This growth takes place as a result of thought. Food for thought is properly supplied by observation and suggestion. Clear ideas concerning earth relations are usually indicative of a keen mind and observant habits.

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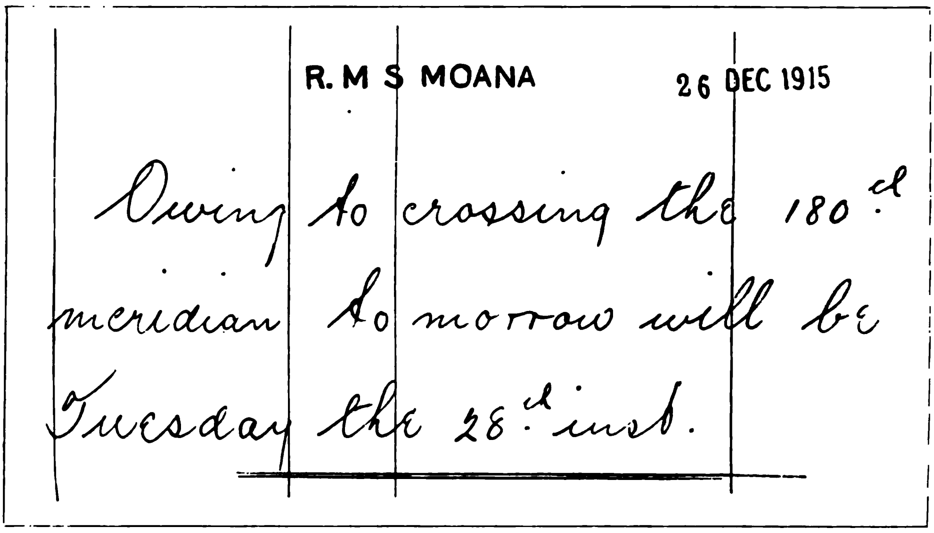
CROSSING THE 180TH MERIDIAN

ONE of the most instructive features of travel is the idea gained of local time, leading to an appreciation of the fact that the earth rotates from west to east. On the land clocks are regulated by railroads. Change of time is made at stations where train crews and engines are changed, and for convenience no divisions of time less than an hour are recognized. Hence it comes about that, for instance, the line separating the central time belt from the mountain time belt is not a meridian but a crooked line passing through the unimportant towns of Portal, Minot, Mandan, Long Pine, Alliance, North Platte, Holyoke, McCook, Phillipsburg, Colby, Cheyenne Wells, Hoisington, Dodge City, Texline, Santa Rosa, and El Paso. In New Mexico the mountain time belt is only about 80 miles wide; in the latitude of Denver and Salt Lake it extends from western Kansas to western Nevada, giving a width of about 1,000 miles. On the ocean also the boundaries of the time belts are determined by practical considerations but to a less extent. The International Date Line, theoretically the 180th meridian, swings west of that meridian in the Aleutian Island region, in order to bring all of Alaska within one belt, and east of that line from Samoa southward, in order to give several important English possessions the same time relations. Except the International Date Line no time belts are marked in the Pacific and clocks on shipboard are changed each day in accordance with positions determined. When, however, the date line is crossed the traveler has an ex-



R. M S MOANA 26 DEC 1915

Owing to crossing the 180d meridian to morrow will be Tuesday the 28d inst.

Notice posted on shipboard prior to crossing the 180th Meridian, sailing west.

perience not likely to be forgotten. Instead of the usual notice that clocks are to be turned ahead or backward a given number of minutes, a notice like that in the figure is posted. In my note book there is no entry for December 27th, for no such day existed. The evening of Sunday, December 26th, was followed by the morning of Tuesday, December 28th. Five months later the day snatched from the calendar was returned, and the note book headings read Sunday, Monday No. 1, Monday No. 2, Tuesday.

HERBERT E. GREGORY,
Yale University.

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A LABORATORY EXERCISE ON THE MERCATOR'S PROJECTION MAP*

I. Make the following comparisons on the globe and on the Mercator's projection of the world:

1. Shape and size of the Arctic Ocean.
   Arctic Ocean with Arabian Sea.
2. Iceland with Ecuador.
3. Width of North Atlantic Ocean (Labrador to France) with the northern boundary of South America.
4. Greenland with Mexico.
5. Baffinland with Central America.
6. Northern boundary of Canada with southern boundary of the United States.
7. Meridians in the Polar regions.
8. Length of a degree of longitude in the Polar regions.
9. Distance between parallels in the Polar regions with distance between parallels in the Torrid Zone.
10. In general, compare the map of the world with the world on the globe.

II.

1. Explain how a map of the world is made on Mercator's projection.
2. Where are the distortions, or exaggerations? Why?
3. The steamship route from San Francisco directly west to Yokohama is 4791 miles. The northern route between these two places is 4536 miles. Why this difference?

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These questions are for use in laboratory work, intended to assist student-teachers in the pedagogy of geography. In considering a course of study in geography for the grades, the student-teacher discusses the questions:

1. When shall I use the globe? Why?
2. When shall I use the map of the world? Why?

Why does the reverse appear true on the Mercator's projection?

III.

1. Compare the conical projection with the Mercator's and with the globe.
2. What other map projections are used?

LOUISE W. MEARS,
Milwaukee State Normal School.

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A LESSON IN MAP READING IN THE 4TH GRADE

By RUTH BATCHELDER
Horace Mann School, New York

THE following lesson was given in a class of fourth grade pupils who had been following the outline of work suggested in "An Experiment in Fourth Grade Geography" in the Journal of Geography for March, 1916. The children had gained a fair amount of skill in locating places by means of meridians and parallels, and were ready for a map-reading lesson which was to interpret to them the colors and symbols of the map. It was decided to make a game of this lesson, and this is how it was done.

We pretended that we knew absolutely nothing about North America, its people, products, industries, and so on. Harold suggested that we make first of all a list of things we would wish to know about in a country new to us.

"The thing I want to know first," said Carl (who had shown unusual interest in the work on meridians and parallels of the previous weeks), "is its latitude and longitude."

"That will tell us something about the climate," said somebody else.

"And if we know the climate, we can tell what will grow there," cried Edith.

After that the list grew. "What do the people do for a living?" "Are there many mountains?" "What kind of people live there?" "What are their largest cities?" "Have they any large lakes or long rivers?"

As we played that we had no reading book to tell us any of these things we turned to our Longmans' Atlas to see how it could help us. On Map 9 we found the map of North America —and then the fun began.

How could we tell if it was east or west longitude, north or south latitude? Norvin discovered in the margins at the top and sides of the page the words "West of Greenwich" and "North Latitude." Thus the question was answered.

Anita found that at the bottom of the page was a key that helped to distinguish the high land from the lower. "And all the rivers are little wiggly black lines, and the large rivers are made with broader lines than the small ones."

"Oh!" almost shouted Stephen, in his eagerness, "some of the water is colored dark blue and some is almost white! Do you suppose that is to show us the deep water and the shallow? And there are tiny figures too, to tell the depth."

"But how deep is a fathom?" asked Robert.

"I'll find out," cried Isabel, jumping up and running to the dictionary, coming back in a few moments to tell him that a fathom is six feet.

"Well, you can't tell much about cities from this map, for there aren't many here," complained Esther.

"Yes," was the answer, "but we can tell that those that are put on the map must be the most important in the country, and, oh, look! 'most every city is on a river, or somewhere on the coast!"

In verifying that statement, somebody discovered Denver, far from any water. "Right in the mountains," said Nathan thoughtfully,—and then—"Why, of course, that's because probably there are mines near there."

That led to a discussion of other industries, and where they might be carried on; fishing, along the coast and on the lakes and rivers; farming, in the plains; manufacturing, where the rivers run swiftly.

"What about railroads?" asked Murray. "They have to get goods from one part of the country to another, and they can't always go by water." In answer to this Donald pointed out the two railroads crossing from the eastern coast to the western.

In the midst of this Howard discovered the little anchors along some of the rivers, and we finally settled that these showed the end of steamboat navigation.

It was easy for someone to find that boundaries were shown by red lines, that there were many harbors, that the central and southern parts were much more thickly settled than the northern, that Alaska belonged to the United States. "And as for government," said Elizabeth, "why, 'United States' sounds free to me, and 'Dominion of Canada' sounds like a king!"

The lesson time was over, books were put away, and we decided that besides having lots of fun we had discovered many things which we had not known before could be learned from maps.

REPORT OF THE N. E. A. COMMITTEE ON COMMERCIAL GEOGRAPHY AS AN ELEMENT IN BUSINESS EDUCATION

By J. Paul Goode
University of Chicago

COMMERCIAL geography has already demonstrated its high value as a fundamental course in a liberal education for business. But the field of geography is so vast, and its subject-matter so prolific and ramifying so intimately into the realms of contributory and related sciences, that it is an exceedingly difficult task to delimit it from the field of general science. And when the general subject has been delimited, it is quite as difficult a matter to formulate a logical sequence in the presentation of the subject-matter, and to distribute emphasis so as to bring out topics of most value, and to train the reasoning power of the student by a compelling search for the relations between cause and effect. There is no subject in the curriculum that offers a better opportunity than geography for training the logical faculty or for widening the horizon of the student in matters of every-day interest in the world about him.

Our ideas in commercial geography were borrowed bodily from an English text by Chisholm. His volume consisted of 800 pages or over, in which he discussed all the important commodities of modern commerce, and followed this discussion by a study of all the leading commercial countries. Our American texts, planned for high schools, not for colleges, have attempted to cover the same field in 400 much smaller pages. The result has been to reduce the work of the student to so rapid a scanning of many things as to give him small chance to get fundamentals firmly planted, or to do any particular thinking about causal relations.

Hence, it is a worthy quest to attempt to establish standards in subject-matter and methods of presentation; and it is with a hope of helping on in this quest that this paper is written and the following suggestions offered. The best approach I have found to the great study of industry and commerce is by way of a general swing around the horizon of the chief commodities of commerce. This study calls for a recognition of the entire list of geographic influences acting, as they may anywhere in the world, in the production and movement of a given commodity. This establishes a wide view of world-relations, and gives a good preparation for the study of a country or a region as a unit. A study of the commodities of commerce, then, is recommended as a minimum unit of study, to occupy half a year in the high school. This may be followed by a half-year devoted to a study of a few of the leading commercial countries. Briefly, the scope of a year's work may be presented as follows:

SYNOPSIS OF THE GEOGRAPHY OF INDUSTRY AND COMMERCE

FIRST HALF-YEAR

I. BRIEF INTRODUCTION:

The geographic influences underlying industry and commerce.
Position on the earth as determining climate.
Land relief: barriers of mountain or dissected land; passes and valley routes through highland barriers; plains and their influence.
Mineral resources: character, areal distribution, accessibility.
Plant and animal life, wild and cultivated, as a basis of commerce.
Human life and development, especially as bearing on industry and commerce: stage of industrial development, education and training, population density, wealth, and government participation in industry and commerce.

II. THE CHIEF COMMODITIES OF COMMERCE:

1. Products of the farm, orchard, and range.
   The cereals, sugar, fruits, vegetables, drugs, animal products.
2. Products of hunting and fishing:
   Furs and fish.
3. Products of the forest:
   Lumber, rubber and other gums, cork, dyes, drugs, etc.
4. Products of mines, quarries, and wells:
   The mineral fuels, iron and other common metals, the precious metals and stones, cement, clay products, etc.
5. Power as a commodity.

SECOND HALF-YEAR

III. THE GEOGRAPHIC INFLUENCES IN COMMERCE:

Advantage of position with reference to trade.
The development of land routes of trade.
Winds and currents and the great ocean routes.
The organization of ocean commerce.
The development of market foci.

IV. LEADING COMMERCIAL COUNTRIES AND THEIR COMMERCE:

Selected important countries, studied as to commercial development and possibilities.
The growth of world-trade and the part played by leading lands.
The countries might be chosen in the following order: United States of America, Brazil; the United Kingdom, British India; Germany, Russia; France, the Argentine, etc., contrasting a highly developed country with a new or undeveloped land, a temperate climate land with a tropical land, and so on.

As an illustration of the method of study, showing the thought-provoking possibilities of the subject, let us indicate the subtopics in the study of wheat: (1) Origin and plant characters of wheat; climate and soil required; types and qualities of wheat; relations between plant characters and the climatic conditions in place of origin. (2) World's wheat-producing areas, the reasons for their location and rank. (3) Influence of climate, soil, surface, labor conditions, the use of machinery, transportation facilities, skill of the farmer. (4) Problems of milling, marketing, establishment of world-market center, and the method of making the price. (5) Wheat in international commerce and politics. (6) The problem of the wheat-supply of the future.

Or suppose we take a mineral commodity, say iron: (1) The qualities of iron which make it valuable; the significance of iron in the civilization of the race. (2) The chief iron-producing regions of the world. (3) Methods of winning the ore in France, Spain, Sweden, and the Lake Superior region. (4) The transportation of the ore; the role of coke and limestone. (5) Rank of producing regions. (6) The world's present steel centers, and reasons for their location and rank. (7) The revolution wrought in industry and commerce by the introduction of cheap steel. (8) Changing rank of nations in iron and steel-production. (9) Significance of government participation in the industry.

It will be observed that the commodities are studied from an economic as well as a geographic point of view, and geographic and economic influences underlying industry and commerce are sought in every stage of the study. This makes of the subject a fascinating field for both teacher and student, and it has the superlative advantage of continual growth, of eternal youth. Though its principles may be firmly rooted in the nature of things, its data are in continual flux with the everyday changes of the weather, of market conditions, and of international political relations. For these reasons it is not an easy subject to prepare in, nor to teach. But the reward of such a study is found in the exhilaration of a constantly widening horizon, and of migration out of a provincial frame of mind. There is a continual incentive to follow developments in the special government reports, the studies published in periodicals, and the shifting observations of the daily press.

This subject, properly presented, is really not a year's work in high school; it is an inoculation of good health which will last through life. No other study offered in school or college is better adapted to an extensive acquaintance with the current history of the industrial world, and this in itself is a large element in a liberal education.

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NOTICE

We plan to print the membership roll of the National Council of Geography Teachers in the June Journal. If your name or address is not correctly printed on the wrapper of your magazine please notify the Circulation Manager promptly .

IQUITOS, PERU, A SEAPORT 2300 MILES INLAND

ONE would scarcely consider a place 2,350 miles inland a seaport; and yet Iquitos, the only eastern outlet for Peru, near the confluence of the many rivers which form the Amazon, is visited regularly by large, ocean-going vessels.

The two weeks journey upriver, from Para at the mouth, is rather monotonous; there is little to see on either bank except low, swampy jungles, save a few important places, such as the city of Manaos, Santarem, Boa Vista, and some others, where the land is comparatively high until one reaches his destination, which is only 328 feet above sea level. At last he steps out on the large, half-million dollar floating wharf of the Booth Co.; and then comes the big surprise, for Iquitos is not at all the rough, frontier Amazon city one sometimes reads about. Writers of such articles can not have known the place well, or have not seen it of late years; for there is much of comfort, beauty, and substance in this the capital of the great Province of Loreto, which occupies nearly the whole of Peru east of the Andes, and contains more than 280,000 square miles, or as much as three or four of our States put together.

The city is comparatively new, being scarcely a third of a century from the jungle stage, and owes its growth and prosperity to the ever-increasing demand for rubber. In fact, it is one of the great rubber ports of the world.

The number of inhabitants of the city varies, from 30,000 during the high-water period to 18,000—it may drop to 12,000—in the dry season, when the rubber gatherers are out.

When everyone is home, during the worst of the rainy season (there are two dry seasons of from two to four weeks each, and the rainy season lasts pretty much over the rest of the year), with the *prefect* and his staff, numerous army officers, merchants, and foreigners, the place is quite lively.

The Amazon is 3 miles wide at this point, and 160 feet deep off the wharf with a difference of about 40 feet between the high and low water stages. When the river is very high, the swamp back of the town is all flooded (the main part of town never is, being 16 feet above the highest watermark), not because it is low enough to be inundated when the Amazon is up, but because the swamp forms a kind of pocket into which the heavy rainfall from the city runs and can not sink through the underlying clay, so remains until it evaporates. When one learns that the annual rainfall for a 10-year average has been 120 inches, and that the location is only a few degrees from the Equator, he understands that this swamp is an ideal breeding place for mosquitoes of all kinds as well as reptiles.

The principal product of this part of South America is rubber, which is gathered from the vast tropical forests, and many thousand tons of it are shipped from Iquitos every year. Next in importance, in the matter of exports, is the tagua nut, or vegetable ivory, and the number of tons of this product sent out is increasing. Third comes cedar logs in the round, which are now being supplied for pencil wood, cigar boxes, etc.

Very few agricultural products are obtainable. The soil, a loose sand underlaid by stiff blue joint clay, which is close to the surface, and is not conducive to farming; the few chacras, or small farms, are some distance from the city. So with the exception of cassava, or yucca, plantains, bananas, sweet potatoes, a little cane (mostly used for making rum), and a small amount of garden vegetables, everything that is eaten, worn, or utilized in any way is imported from Europe and the United States or other parts of South America. A few cattle and hogs are raised in cleared areas on the Amazon or near-by rivers; but most of the cattle and all the horses and mules are brought from great distances, over the Andes and down the tributaries of the Maranon, Ucayali, and Huallaga Rivers, hundreds of miles, on immense rafts, or balsas, stopping every night, after the worst of the rapids are passed, to cut grass to feed the animals. This is dangerous and expensive transportation, consequently beef is very high in Iquitos. So are all the imported articles, as freight rates are almost prohibitive, while import duties seem higher than necessary.

Four years ago a very powerful wireless station was erected by the Government to replace one less powerful; and now the town is in direct radio connection with Lima, clear across the Andes, without any relay of messages. Indeed, the operator frequently told me he had "picked up" Washington the night before and heard messages going from there.

All the coal is brought from Norfolk, Va., and although very high in price is used by the ice factory, bottling works, electric-light plant, and various machine shops, both Government and private. Even the little street railroad, which runs from the customhouse along the principal streets to deliver freight, burns coal. This road also runs passenger trains, and operates a line out to a resort in the suburbs, called Lake Marona Cocha. To be sure, there is plenty of wood near by that is used to a certain extent; but it has not sufficient heat units to maintain steam well.

Twenty-five or thirty steamers, of from 4 to 8 feet draft, and calling this their home port, ply the upper Amazon and numerous rivers that flow into it, though they never go below the Javary, which is the boundary between Brazil and Peru along its line of flow. They belong to the many large stores and trading companies located in Iquitos, that carry very complete stocks of goods, mostly European, and in ordinary times when rubber is "up" do an immense business.

The Booth Co., an English corporation, maintains a line of steamers between New York and Iquitos, and another from Liverpool, and there used to be a boat from one port or the other every three weeks; but since the European war began the sailings have been irregular.—[Samuel E. Bayless, in the *Bulletin of the Pan American Union*, Dec., 1916.]

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SOUTH AMERICAN TIMBER RESOURCES

THE commercial value of these vast forests is still very little known. Botanically, the South American forests, particularly those near the Equator and along the river bottoms, consist of a large number of species. "On a single acre it is hardly possible to find two or three trees of the same kind."

What is demanded, especially in the international markets, is a light, strong, easily workable timber which can be supplied in large quantities and delivered at a low price. Such timber has so far been supplied by the northern coniferous and temperate hardwood forests of Europe and North America. The richest forests in the world, commercially, those of northern Russia and Sweden, botanically are very poor. They consist of only two species, the Scotch pine and the spruce. If the South American tropical forests contain only a few commercially useful tree varieties which are scattered among a large number of other species of low or no present commercial value at all, the high cost of logging them may make the exploitation of such forests unprofitable. * * * The few trees known at present as commercially valuable are invariably found scattered among a great many unutilizable ones. In order to cut and remove the valuable species it is necessary, therefore, to cut and leave a good deal of useless material.

If further studies show that the forests of South America contain, in addition to the rare dye woods, quebracho, greenheart, mahogany, etc., a large number of utilizable hardwoods similar to cedro, which is always being exported from there, the economic importance of the South American forests will be great. Our present knowledge of the technical properties of th woods of the South American forests is very inadequate. From what we do know at present, however, there are three species which, because of their technical properties, may furnish woods suitable for wide use. These are the Parana pine and the Chilean pine, two coniferous species, and the Spanish cedar, which is a soft hardwood. Most of the other hardwoods known at present are exceedingly hard and heavy and, therefore, difficult to saw. * * *

The following is an attempt to estimate very roughly the area occupied by the different classes of South American woods and on the basis of these estimates to outline the possible economic importance of South American forest wealth. The total forest area of 1,924,000,000 acres may be divided into distinct forest regions according to the prevailing commercial species.

1. The Parana pine forest region occupies an area of approximately 309,000 square miles, the greatest part in the southeastern portion of Brazil. One company alone owns a solid forest, much of which is still in the primitive state, aggregating 3,000,000,000 feet and averaging over 4,000 feet to the acre.

2. The Antarctic beech region is the only other region in which conifers are found, such as the Chilean pine, larch, and cedar. The Chilean pine is botanically very close to the Parana pine. This region lies chiefly on the slopes of the Andes and occupies in all an area of approximately 96,000 square miles.

3. The tropical and subtropical hardwoods occupy by far the largest areas. The tropical hardwoods are found over an area of some one and a half million square miles and the subtropical hardwoods over an area of 259,000 square miles. The most valuable tree of the tropical hardwood forest is the *cedro*. *Cedro* constitutes one of Brazil's most important export hardwoods and is commonly known in the United States as Spanish cedar. This species does not form pure forests over large areas but is found scattered among the tropical hardwoods throughout Brazil from the Amazon to the Parana River. Its softness, the ease with which it can be worked, its ability to hold paint and take a polish, as well as its high grade, commend it for many special uses and makes it first in economic importance of all the Brazilian hardwoods.

4. The hardwoods in which quebracho occurs in commercially important species are found chiefly in northern Argentina. The total possible yield from the forest areas where quebracho occurs in commercial quantities is estimated at 168,000,000 tons, while the present yearly consumption of the wood for all purposes is a little less than 1,000,000 tons. The small yield per acre

makes it necessary to cut over about 500,000 acres annually in order to secure the 1,000,000 tons of wood which are in demand. Quebracho wood is one of the principal commercial products of South America, its main value being for tannin extract and crossties.

5. Greenheart is the most important tree of British Guiana, the only place where it is being cut extensively. Greenheart grows along the seacoast and watercourses, seldom extending more than 50 miles inland and never more than 100 miles. It reaches its best development in a strip of country between 2 and 3 miles wide immediately behind the alluvial deposit which fringes the seacoast. The present export of timber from British Guiana is in the neighborhood of 200,000 cubic feet, which, on the whole, is smaller than it was in the past.—[Raphael Zon in *Geographical Review*, Oct., 1916.]

CURRENT GEOGRAPHICAL MATERIAL

Menace to the Scotch Mineral Oil Trade

The lowlands of Scotland abound in shales rich in oil from which for more than half a century paraffin oil and solid paraffin have been largely extracted. The development of the American, and afterwards of other petroleum fields, caused such severe competition with the oil that the industry had difficulty in struggling on. It was saved partly by the solid paraffin, but still more by the by-product, sulphate of ammonia, which came to be the staple product of the industry. But this, it appears, is now threatened by the recent discovery in Germany of a method of fixing atmospheric nitrogen at a very cheap rate through the production of sulphate of ammonia by electrolysis. G. G. C.

The War and Educational Reconstruction in Great Britain

One result of the war has been to produce profound heart-stirring in England as to the need for revised methods of education. For the first time one hitherto unconnected with politics, Mr. H. A. L. Fisher, vice-chancellor of the University of Sheffield, has been appointed minister of education solely on account of his service to that cause. The present cry is for increased attention to applied science, and this cry is rousing dread on the part of those concerned with the more human branches of school education. Controversy is raging between the adherents of the "scientific" and the "humanistic" studies, and five associations connected with the latter, including the Geographical Associ tion, assembled in conference, have drawn up a series of resc tions on the subject. The third resolution runs thus: "Humanistic education implies the adequate study of language and literature, geography, and history, which in each case should, at the appropriate stage of education, go beyond the pupil's own language and country"; and the main burden of the resolution is a protest against premature specialization on any one group of studies. G. G. C.

THE WAR AND THE WOOLEN INDUSTRY

Figures supplied at the beginning of the year by the chief London wool brokers, throw interesting light on the effect of the war on the woolen industry. It would appear that of the colonial wool consumed in Europe and America in 1913, amounting in all to 2767 thousand bales, 1043 thousand were consumed in the United Kingdom, 1670 thousand on the European continent, and only 54,000 in America; whereas in 1915, while the total consumption had sunk to 2686 thousand bales, the British consumption had risen to 1923 and the American to 551, while that of the European continent had sunk to 212, and in 1916, the corresponding figures were, total 2377, British consumption 1384, American 720, continent of Europe 273. The British consumption of 1915 was by far the largest in the whole history of the industry, notwithstanding the fact that the industry had to be carried on in the face of great labor difficulties. The explanation lies in the fact that the product that year consisted mainly of a few fabrics of simple and uniform design (chiefly khaki), in place of the more varied and expensive cloths which usually come from British looms. G. G. C.

A TUNNEL UNDER THE STRAIT OF DOVER

The European war has assured both England and France that they are and must continue to be friends. With subjective barriers out of the way objective ones tend to intensify themselves. So the world is not surprised to hear that the project, "A Tunnel Under the Strait of Dover," has been revived. The English and French engineers have tentative plans for the tunnel. At one point the strait is only twenty-three miles wide, but even this short distance is usually dreaded by sailors as well as by passengers.

The plans call for three tunnels which with their approaches will be thirty-two miles long. Two of the tunnels are to be for railways which will be parallel and on the same level. Below the railway tunnels there is to be a nine foot drainage tunnel, which will be built first. The prospective work can be completed in six years at a cost of about $10,000,000. In order to get the work done so quickly construction is to progress from both ends.

For many years the mentioning of such a tunnel has aroused the English almost to anger, because they have looked upon the water which separates them from "the Continent" as a great moat, the draw-bridge of which they control. They have argued that with the tunnel "militarism" of Europe might unexpectedly and suddenly march its armies into England. In such a case the English navy would be almost worthless. With the assurance of the friendship of France, it is reported that the English now favorably consider the tunnel.

M. K. DAVIS.

COTTON FIBER CONSUMED IN THE MANUFACTURE OF EXPLOSIVES

During the three months ending December 31, 1916, there were 81,007,539 pounds of bleached cotton fiber, including linters and hull fiber, consumed in the United States in the manufacture of guncotton and explosives of all kinds. This quantity was equivalent to 162,015 bales of 500 pounds each and compares with 133,982 bales, 142,725 bales, and 144,988 bales for the quarters ending September 30, June 30, and March 31, respectively. There were 583,710 bales of bleached cotton fiber consumed in the manufacture of explosives during 1916 and 244,003 bales during 1915. The quantity of bleached cotton fiber held in establishments engaged in this manufacture on December 31 amounted to 9,876,772 pounds, equivalent to 19,754 bales.

The loss in preparing linters and hull fiber from the wrapped and iron-bound bale to the purified material, as used in nitration, is from 30 to 40 per cent, depending on the condition of the raw fiber, some stock being quite clean and some very trashy. Based on an average loss of 35 per cent, the gross weight of unbleached cotton fiber used in the manufacture of explosives during the three months ending December 31 was 249,254 equivalent 500-pound bales, and during 1916, 898,015 bales.

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NOTES

Prof. A. E. Parkins, of the Peabody College for Teachers, Nashville, has written a highly interesting series of articles on the "Development of Transportation in Pennsylvania," which appeared in the *Bulletin of the Geographical Society of Philadelphia*, Vol. 14, July and October, 1916, and Vol. 15, Jan. 1917. The articles deal with four main topics: The Development of the Road System, The Development of River Traffic, The Rise a

Decline of the Canal, The Rise of the Railroad. There are many illustrations and an excellent bibliography.

Mr. William H. Haas of Northwestern University has an article on "The Influences of Glaciation in Ohio," in the *Bulletin of the Geographical Society of Philadelphia*, Jan., 1917. Mr. Haas has made a careful statistical study of economic aspects of agriculture in the glaciated and in the driftless parts of Ohio. He states some of his conclusions as follows:

"Having in mind the great contrasts between non-glaciated and glaciated Ohio, (1) in the percentages of the improved farm lands, (2) in their value, (3) in the products of these lands, (4) in the kind and amount of live stock, and (5) in the population and industrial activities, no one can fail to recognize the great superiority of the glaciated region. That these contrasts are the results of differences in physical conditions brought about chiefly through glaciation also may be considered as certain.

"It is not maintained that every contrast noted above is due entirely to glaciation. The density of population, the number and size of cities, and the value of manufactured products are abnormally out of proportion to the relative sizes of these two areas. Other than glacial factors no doubt enter into the problem and modify results. The development of many of the larger cities in northern Ohio has been greatly enhanced by their situation along the main trunk lines between New York and Chicago. The lake itself is an influential factor, especially in connection with the iron industry. The problem is further complicated by the fact that the lake exists because of glaciation, and that the trunk lines are where they are because of the flattish areas in northern Ohio, and because of the Hudson-Mohawk depression, due to or modified by glaciation. To evaluate properly such factors a much more intensive study is needed."

The 1917 meeting of the Association of American Geographers will be held at the University of Chicago, December 27, 28, and 29. The annual meeting of the National Council of Geography Teachers will probably be held at the same time and place.

Prof. W. M. Davis, chairman of the Geography Committee of the National Research Council, announces that the committee will consist of Messrs. L. A. Bauer, A. P. Brigham, A. H. Brooks, H. C. Cowles, W. M. Davis, J. F. Hayford, D. W. Johnson, H. F. Reid, J. R. Smith, and R. DeC. Ward. The objects of the National Research Council are:

(1) The preparation of a national inventory of equipment

for research, of the men engaged in it, and the lines of investigation pursued in cooperating Government Bureaus, educational institutions, research foundations and industrial research laboratories; this inventory to be prepared in harmony with any general plan adopted by the proposed Government Council of National Defense.

(2) The preparation of reports by special committees, leading to the statement of important research problems and the serving as a clearing house for the coordination of research in various departments of science.

(3) The promotion of cooperation in research, with the object of securing increased efficiency; but with careful avoidance of any hampering control or interference with individual freedom and initiative.

(4) Cooperation with educational institutions, by supporting their efforts to secure larger funds and more favorable conditions for the pursuit of research and for the training of students in the methods and spirit of investigation.

(5) Cooperation with research foundations and other agencies desiring to secure a more effective use of funds available for investigation.

(6) The encouragement in cooperating laboratories of researches designed to strengthen the national defense and to render the United States independent of foreign sources of supply liable to be affected by war.

◆

WHYS IN INDUSTRIAL GEOGRAPHY

1. Why are there cities and why do all people not live in cities?

2. Why is our city population increasing more rapidly than our country population?

3. Why must wide differences exist between living in the city and in the country?

4. Why are the industries of the city and the country each necessary to the welfare of the other?

5. Why do cities have paved streets, tall buildings, policemen, street cars and many other things not found in the country?

6. Why does manufacturing center in the northeast quarter of the United States?

7. Why is agriculture most fully developed in the north-central states?

8. Why is cotton grown only in the southern states?

9. Why are the great meat-packing centers in the Middle West?

10. Why is fruit-growing especially successful around the lower Great Lakes?

11. Why are railroads most numerous in the northeastern quarter of the United States?

12. Why is rice produced on the lowlands?

13. Why is cane sugar produced in Louisiana and beet sugar in the northern states?

14. Why is sheep grazing extensively practiced in Wyoming, Montana, and neighboring states?

15. Why is coffee not grown in the United States? tea? rubber?

16. Why has the center of wheat production in the United States constantly moved west and northwest?

17. Why are many American farmers emigrating to Canada?

18. Why are many Canadians from the eastern provinces coming to the United States?

19. Why has population increased so much faster in the United States than in Canada?

20. Why is manufacturing much more fully developed in the United States than in Canada?

21. Why is our trade with Cuba particularly large? with Mexico?

22. Why is our trade with Europe much larger than with any other Grand Division? Why very small with Australia? with Africa?

23. Why does Asia offer an important field for the increase of our foreign trade?

24. Why do manufactured goods ordinarily form a larger part of England's exports than of ours?

25. Why is the foreign trade of the United Kingdom normally larger than ours?

26. Why did the United States permit its merchant fleet engaged in foreign trade to decline to almost nothing prior to the present war?

27. Why does the traffic on our Great Lakes call for a great many boats?

The JOURNAL of GEOGRAPHY

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MATERIAL ON GEOGRAPHY WHICH MAY BE OBTAINED FREE OR AT SMALL COST*

By MARY JOSEPHINE BOOTH, Librarian
State Normal School, Charleston, Ill.

SOURCES AND VALUE

PUBLICATIONS of this description are usually issued in the form of well illustrated pamphlets and will supplement with little expense the books on geography used in the class room. They come from several sources, the United States government, the different state governments, railroads, steamship lines, manufacturing firms, and chambers of commerce of cities and towns.

Mr. Roland M. Harper has an article entitled "A Neglected Source of Geographical Material" in the Journal of Geography for June 1916, p. 392-4, in which he states reasons why this material is not used as much as it might be and gives his estimate of its value in the following words: "As far as accuracy is concerned, the present standard of free geographical literature, with the possible exception of that issued by land companies, is higher than one might suppose without investigation. Many of the statements in these advertising pamphlets relate to facts which there would hardly be any motive for misrepresenting, or which can easily be verified in these days of rapid dissemination of knowledge. Even some state supplements to school geographies, published during the present century, are more extravagant, and even inaccurate in describing the advantages of their respective regions, and say less of the disadvantages, than some of the literature here discussed."

Mr. H. H. Williams of the Bureau of Education, Manila, P. I., in an article entitled "Travel Booklets as an Aid to Geography" in the Journal of Geography for January, 1917, p. 161-3, gives a number of suggestions on the use of this kind of material together with a number of addresses not included in this list.

HOW TO OBTAIN

In writing for publications issued by societies, manufacturing firms, railroads, and steamship lines, give the names of the pamphlets desired and enclose postage. Some firms do not recognize a request for pamphlets unless a stamp is enclosed. If you want to obtain the most recent material, write for a list of publications and choose the ones needed, for new booklets are being frequently issued.

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* Selected from a larger list published as Bulletin 54 of the Eastern Illinois Normal School, Charleston, Ill. Reprinted by permission.

Address the proper department for the state publications, enclosing postage. The publications of the Pan American Union may usually be obtained free from your congressman.

In regard to obtaining government publications it is difficult to lay down rules, as the practice of distribution varies in the different departments and bureaus. In this list the department or bureau issuing the pamphlet has usually been indicated and also the price at which the Superintendent of documents sells it. Sometimes the pamphlet may be obtained free by writing direct to the issuing bureau or department. If the supply for free distribution has been exhausted, you will be notified and then the publication can be bought from the Superintendent of documents at the price stated.

Because of the ephemeral nature of many of these publications certain titles given in this list may even be out of print. Frequently new booklets will be issued to replace them and on this account it is usually better, when writing for a certain title, to add a request for other similar publications.

NEW MATERIAL

To keep up with the geographical material obtainable free or at small cost which is being constantly issued, consult the Monthly Catalogue of United States Public Documents and the Monthly List of State Publications, both distributed by the Superintendent of documents, Washington, D. C. Read the advertisements of railroads and steamship companies appearing in magazines and newspapers, which frequently offer to send free or for postage descriptive booklets. These advertisements change with the seasons and in the course of a year will include almost all parts of the world. In the columns of Public Libraries, The Library Journal, The Wisconsin Library Bulletin, and other periodicals are often found items giving the names of recent pamphlets.

SUGGESTIONS

Most firms are glad to supply material free to teachers for use in their schools but object to receiving 30 or 40 requests from the same town from small children who are making collections of pictures, etc. Teachers should not have a whole room write for the same pamphlets as this practice makes it difficult for those really needing the pamphlets to get them.

County and city superintendents of schools may be able to obtain several copies of the material in this list and keep it in a convenient place for the use of teachers under their direction.

SOME POINTS ABOUT THIS LIST

The addresses of those issuing the pamphlets listed have been given fully but the state, province, or country has been uniformly omitted when the name of the state, province, or country occurs as the subject. In order to shorten the list usually only one pamphlet from any one source is listed, the phrase "also other publications" being used to show that others on the same subject are issued.

The highest limit in price has been placed at fifty cents, except in a few instances in the bibliographies and in the list of Educational exhibits. Where no price is stated the publications were sent free to the complier and no information in regard to price was given. Certain publications which were not seen, but which there was reason to believe would prove worthy, have been listed with a note showing that they have not been examined.

EDITIONS

The first edition of this list was published in the Wisconsin Library Bulletin for January-February, 1912. A revised list was published in the Journal of Geography, January, 1914, a number of the new titles having been suggested by Miss Adelaide R. Hasse, Chief, Public Documents Department, New York Public Library. It was reprinted by the American Library Association Publishing Board, 78 East Washington Street, Chicago. Another list, partially revised, was printed in the Normal School Bulletin, October 1914; the same list with the addition of a few titles was printed in the Journal of Geography, January 1915; the new titles in these last two lists were largely pamphlets issued by commercial clubs and chambers of commerce.

This list is a complete revision of the other lists published. It has been compiled from responses to letters sent out in the latter part of 1916.

ACKNOWLEDGMENT

The generosity of societies, firms, railroads, steamship lines, and individuals in sending material for examination has made this list possible and their kindness is appreciated.

LIST OF ABBREVIATIONS

The usual abbreviations of states and months are used.

agric.—agricultural, agriculture
Amer.—American
ass'n—association
ave.—avenue
bldg—building
Bost.—Boston, Mass.
bull.—bulletin
bur.—bureau
c.—cent, copyright
Chic.—Chicago, Ill.
circ.—circular
co.—company
cong.—congress
d.—penny, pence=2c.
dep't—department
div.—division
doc.—document
ea.—each
ed.—edition
educ.—education
e. g.—for example
exp.—experiment
ext.—extension
geol.—geological
gov't—government
internat'l—international
Lond.—London, England
mfg—manufacturing
Minn.—Minneapolis, Minn.
misc.—miscellaneous
nat'l—national
n. d.—no date
no.—number
n. s.—new series
N. Y.—New York, N. Y.
pap.—paper
Phil.—Philadelphia, Penn.
p.—pages
pt—part
R. R.—railroad, railway
rep't—report
rev.—review, revised
s.—shilling=25c.
S. S.—steamship
ser.—series
sess—session
st.—street
sta.—station
Sup't of doc.—Superintendent of documents
sur.—survey
univ.—university
v.—volume
Wash.—Washington, D. C.

GENERAL LIST

Bibliography

Aids in high school teaching; pictures and objects by J. C. Dana and Blanche Gardner. 1916. The H. W. Wilson co. White Plains, N. Y. 75c.
Gives lists of dealers in photographs, postcards, films, educational exhibits, relief maps and slides.

Commercial and agricultural organizations of the United States. Misc. ser. 28. Foreign and domestic commerce bur. Wash. Sup't of doc. Wash. 15c.

Commercial organizations in southern and western cities by G. W. Doonan. 1914. Special agents ser. 79. Foreign and domestic commerce bur. Wash. Sup't of doc. Wash. 10c.
These two lists of commercial organizations are useful in obtaining names and addresses of chambers of commerce and commercial clubs. They do not list publications.

Geography, in Frederic K. Noyes, Teaching material in government publications. Bull. 1913. no. 47. p. 32-44. Bur. of educ. Wash. Sup't of doc. Wash. 10c.
Includes physical, political and commercial geography and maps.

Geography, travel, exploration; list of United States government publications. 1916. Sup't of doc. Wash.

Maps, atlases and geographical publications by Sarah B. Ball. 1915. The H. W. Wilson co. White Plains, N. Y. 75c.

The picture collection. 1916. The H. W. Wilson co. White Plains, N. Y. $1.00.

This publication is now in the hands of the printer. It deals with inexpensive pictures of all kinds giving sources.

Publishers of inexpensive geography material. 1916. Free public library, Newark, N. J. 5c.

Mimeographed sheet complied for New Jersey library association.

Sources of free material in Report of the committee on instruction by means of pictures. School doc. no. 6. 1913. p. 111-116. Bost. public schools. Bost.

Gives sources of slides.

Supplementary materials for teaching geography in elementary schools by J. W. Hubbard in Journal of Geography 14: 136-43, Jan. 1916. Same list reprinted with additions may be obtained from J. W. Hubbard, State normal school, Worcester, Mass.

Annotated list of inexpensive books arranged by grade together with list of illustrative material etc.

ALABAMA

Alabama land book. 1916. Dep't of agric. and industries, Montgomery. 25c.

A southern port, Mobile. c1916. Chamber of commerce and business league, Mobile.

ALASKA

Alaska. n. d. Border line transportation co. Seattle, Wash.

Alaska. n. d. Canadian Pacific R. R. Montreal, Can.

Alaska. 1914. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Alaska and the scenic Yukon country. n. d. White pass and Yukon route, Seattle, Wash. Also other publications.

Alaska, our frontier wonderland. 1916. Alaska bur. Seattle chamber of commerce, Seattle, Wash. 10c.

Commerce and industries of Alaska, Hawaii, Porto Rico, and the Philippine islands. 1913. Special agents ser. 67. Bur. of foreign and domestic commerce, Wash. Sup't of doc. Wash. 10c.

General information regarding Alaska. 1916. Interior dep't, Wash.

The great Pacific northwest and Alaska. n. d. Union Pacific R. R. Chic.

Mineral resources of Alaska; rep't on progress of investigations in 1915 by A. H. Brooks and others. 1916. Bull. 642. Geol. sur. Wash. Sup't of doc. Wash. 35c.

The North American Alps, Canadian Rockies, Mount Robson route. n. d. Grand trunk Pacific, Winnipeg, Man. Also other publications.

Alaska; list of public documents for sale by Sup't of doc. 1916. Sup't of doc. Wash.

See also Fisheries and Fur farming, in list on Industries and commercial products.

ALBERTA

Opportunities in Alberta. 1916. Dep't of agric. Edmonton. Also other publications.

ARGENTINE REPUBLIC

Argentina. 1916. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Argentine international trade. 1915. Distributed by Pan Amer. union, Wash. Also distributes Argentine railways by Leopold Grahame. 1916. Argentine republic; general descriptive data. (latest ed.) Argentine trade with the world. 1915, and Argentine republic. 1915, published by the Argentine commission to Panama-Pacific exposition, containing paragraphs on physical features, interchange of commerce, city of Buenos Aires, etc. and Commerce of Argentine republic. (latest ed.)

The Argentine republic. 1916. Guaranty trust co. 140 Broadway, N. Y.

ARIZONA

Along the Apache trail of Arizona. n. d. Washington-Sunset route, Wash.

Arizona, the newest state. n. d. Santa Fe, 1115 Railway exchange, Chic. Also other publications.

The Salt river valley and Maricopa county, Arizona. 1916. Commissioner of immigration, Phoenix.

ARKANSAS

Arkansas homes and harvests. n. d. Cotton belt route, St. Louis, Mo. Also other publications.

Biennial rep't. (latest ed.) Bur. of mines and manufactures and agric. Little Rock. 10c.

The heart of the Ozarks. n. d. Missouri and North Arkansas R. R. Harrison. Also publishes Oak leaves, 1915, and The zinc fields of North Arkansas. n. d.

AUSTRALIA

Australia, its resources, industries and trade. 1911. Special consular rep'ts 47. Bur. of foreign and domestic commerce, Wash. Sup't of doc. Wash. 10c.

The Australian commonwealth; its resources and production. 1915. Bur. of census and statistics, Melbourne. Distributed by Gov't representative of Victoria, 687 Market st. San Francisco, Cal.

Report of the American trade commission on industrial conditions in Australia. 1914. Nat'l ass'n of manufacturers, 30 Church st. N. Y.

AUSTRIA

The story of the Danube. 1915. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c. Also publishes Vienna, the queen city, 1914. 15c.

BERMUDA

Bermuda. n. d. Canada S. S. lines ltd, 32 Broadway, N. Y.

Bermuda. n. d. Royal mail steam packet co. 26 Broadway, N. Y.

BOLIVIA

Bolivia; general descriptive data. (latest ed.) Pan Amer. union, Wash. Also publishes map showing forest and agricultural areas and mineral localities. 1912. Size 17 x 20 inches. 25c. and Commerce of Bolivia. (latest ed.)

BRAZIL

Brazil. 1917. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Brazil; general descriptive data. (latest ed.) Pan Amer. union. Wash. Also publishes Commerce of Brazil. (latest ed.) and distributes Brazil in 1913. (annual) by J. C. Oakenfull.

BRITISH COLUMBIA

Handbook of British Columbia. 1913. Bur. of provincial information, Victoria. Also other publications.

Opportunities in British Columbia. c1916. Minister of agric. Victoria.

CALIFORNIA

California, 1915. Northwestern line. Chic. 4c.

California, resources and possibilities. (annual) Cal. development board, San Francisco.

Climate of San Francisco by A. G. McAdie. 1913. Bull. 44. Weather bur. Wash. Sup't of doc. Wash. 5c.

Fresno county, California, by Walter B. Clausen. 1915. Board of supervisors, Fresno.

Little Journeys in California. Rock Island lines, Chic.

Los Angeles, California, the city and the county. 1915. Chamber of commerce, Los Angeles. Also publishes Los Angeles today. 1916, and other publications.

Sacramento Valley. (latest ed.) Southern Pacific R. R. St. Louis, Mo. Also other publications.

San Diego, California, city and county. n. d. Board of supervisors of San Diego county, or, Chamber of commerce of San Diego county, San Diego. Also other publications.

San Francisco. 1915. Chamber of commerce, San Francisco. Also other publications.

CANADA

Atlas of Canada. 1916. Dep't of the interior, Ottawa. Also other publications.

Commerce and industries of Canada and Newfoundland by A. G. Robinson. 1913. Special agents ser. 76. Foreign and domestic commerce bur. Wash. Sup't of doc. Wash. 10c.

Niagara to the sea by Garnault Agassiz. c1915. Canada S. S. lines ltd, Montreal, Can.

The North American Alps, Canadian Rockies, Mount Robson route. n. d. Grand trunk Pacific, Winnipeg, Man. Also publishes Across the continent through Canada. c1916, and other publications.

Thousand islands and Rideau lakes. n. d. N. Y. central lines, N. Y.

CENTRAL AMERICA

Jamaica, Panama canal, Central and South America. 1912. United fruit co. 17 Battery place, N. Y.

Latin America; general descriptive data. 1916. Pan Amer. union, Wash. Also publishes Latin American foreign trade in 1913. 1914. Reprint from Pan Amer. union Bull. Dec. 1914. Map of Central America, including Cuba, Porto Rico and the islands of the Caribbean sea. Size 14 by 19½ inches. 25c. Prepared by Amer. bank note co. Also distributes a Map showing railroads of Latin America in operation and under construction. 1913, and other publications.

CHILE

Chile. 1916. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Chile; general descriptive data. (latest ed.) Pan Amer. union. Wash. Also publishes Commerce of Chile. (latest ed.) and Santiago de Chile. 1909.

CHINA

China. 1915. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

China. 1916. Guaranty trust co. 140 Broadway, N. Y.

COLOMBIA

Colombia; general descriptive data. (latest ed.) Pan Amer. union, Wash.

Colorado

Colorado. 1915. Northwestern line, Chic. 4c.

Colorado climatology by R. E. Tremble. 1912. Bull. 182. Agric. exp. sta. Fort Collins.

Railroad map of Colorado. n. d. Public utilities commission, Denver.

Scenic Colorado and Utah. n. d. Burlington route, Chic. Also other publications.

Short scenic trips from Denver into the Colorado Rockies. c1916. Tourist and publicity bur. Civic and commercial ass'n, Denver. Also other publications.

Crater Lake National Park

Forest of Crater lake national park by J. F. Pernot. 1916. Interior dep't, Wash. Sup't of doc. Wash. 20c.

General information regarding Crater lake national park. (annual) Interior dep't, Wash.
Contains bibliography.

Cuba

Cuba, a winter paradise. (latest ed.) United R. R. of Havana, Havana, or 42 Broadway, N. Y.

Cuba, general descriptive data. (latest ed.) Pan Amer. union, Wash. Also publishes Commerce of Cuba. (latest ed.) Future farming in Cuba by Forbes Lindsay, 1913, and distributes A few facts and figures in regard to Cuba by Cuba—Dep't of agric. n. d. and Map prepared by War college div. of the War dep't. 1911. Size 15 by 39 inches. 50c.

Havana and points in Cuba. n. d. N. Y. and Cuba mail S. S. co. Foot of Wall st. N. Y.

Bibliography—List of United States government publications on insular possessions, 1915. Sup't of doc. Wash.

Delaware

Delaware the diamond state. 1911. State board of agric. Dover.

Wilmington as a manufacturing center. n. d. Board of trade, Wilmington.

Denmark

Copenhagen and its environs. n. d. Published by the Danish tourists' ass'n. Address Thos. Cook and son, 245 Broadway, N. Y.

The traveller's guide. n. d. Scandinavian-Amer. line, 1 Broadway, N. Y.

District of Columbia

Guide to the national capital. 1913. Pennsylvania lines, Pittsburgh, Penn.

Washington, the capital. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Washington, the nation's capital. n. d. Chamber of commerce, Wash. Also distributes a pictorial map of Washington.

ECUADOR

Commerce of Ecuador. (latest ed.) Pan Amer. union, Wash. Also publishes Ecuador; general descriptive data. (latest ed.)

EGYPT

Egypt, the land of mystery. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Mediterranean cruises. 1913. Royal mail steam packet co. Address Thos. Cook and son, 245 Broadway, N. Y.

A tourist in Egypt. 1910. Cunard S. S. co. Tourist dep't, 21-24 State st. N. Y. Also other publications.

ENGLAND

London. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

FRANCE

Paris the incomparable. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

The valley of the Rhone. n. d. Paris, Lyon-Mediterranee R. R. 281 Fifth ave. N. Y. 4c. Also other publications.

GENERAL GRANT NATIONAL PARK

Forests of Yosemite, Sequoia, and General Grant national parks by C. L. Hill. 1916. Interior dep't, Wash. Sup't of doc. Wash. 20c.

General information regarding Sequoia and General Grant national parks. (annual) Interior dep't, Wash.
Contains bibliography.

GEORGIA

Georgia. n. d. Southern R. R. Wash.

The land of promise. n. d. Georgia, Florida and Alabama R. R. co. Bainbridge.

GERMANY

The story of the Rhine. 1914. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

GLACIER NATIONAL PARK

General information regarding Glacier national park. (annual) Interior dep't, Wash. Contains bibliography.

Glacier national park. n. d. Great northern R. R. St. Paul, Minn. Also other publications and two series of postcards, 25c ea.

Glacier national park; popular guide to its geology and scenery by M. R. Campbell. 1914. Bull. 600. Geol. sur. Wash. Sup't of doc. Wash. 30c.

Origin of scenic features of Glacier national park by Marius R. Campbell. 1914. Interior dep't, Wash. Sup't of doc. Wash. 15c.

Topographic map of Glacier national park. Geol. sur. Wash. 25c. Size 32 by 28½ inches; scale 2 miles to the inch.

GRAND CANYON OF THE COLORADO

The grand canyon. 1915. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Titan of chasms. c1910. Santa Fe R. R. 1115 Railway exchange. Chic. Also other publications.

GREAT LAKES

Lake Superior to the sea by Garnault Agassiz. c1915. Northern navigation co. ltd. Sarnia, Ont.

HAWAII

Commerce and industries of Alaska, Hawaii, Porto Rico, and the Philippine islands. 1913. Special agents ser. 67. Bur. of foreign and domestic commerce, Wash. Sup't of doc. Wash. 10c.

Hawaii by F. H. Newell. 1909. 60th cong. 2nd sess. Senate doc. 668. Sup't of doc. Wash. 10c.

Island tours in Hawaii. n. d. Inter-island steam navigation co. ltd, Honolulu. Also publishes Tourists' map of Hawaii. n. d.

Map and guide of Hawaii. 1917. Hawaii promotion committee, Honolulu. Also publishes Map and guide to island of Kauai, 1917, Map and guide to island of Maui, 1917 and Map and guide to Oahu. 1917.

BIBLIOGRAPHY—List of United States government publications on insular possessions. 1915. Sup't of doc. Wash.

HUNGARY

The South railway in Austria-Hungary. n. d. published by the South R. R. Vienna. Address Thos. Cook and son, 245 Broadway, N. Y. Also distributes The Trans-Danubian district, Croatia and the Hungarian coast. (latest ed.) Royal Hungarian state R. R.

ICELAND

The traveller's guide. n. d. Scandinavian-Amer. line, 1 Broadway, N. Y.

IDAHO

Pacific northwest. 1915. Northwestern R. R. Chic. 4c.

Washington and northern Idaho. n. d. Northern Pacific R. R. St. Paul, Minn.

ILLINOIS

Across picturesque Illinois and Iowa. n. d. Northwestern line, Chic. 2c.

Starved rock and the Illinois river valley. n. d. Rock Island lines, Chic.

INDIA

Beauty spots of India. 1915. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

INDIANA

Gary. n. d. Commercial club, Gary. 15c.

IRELAND

Romantic Ireland. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

ITALY

Italy. n. d. Italian state R. R. 281 Fifth ave. N. Y. 4c.

Venice, the island city. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

JAPAN

Japan. c1914. Canadian Pacific R. R. co. Apply to General agent, Passenger dep't, Canadian Pacific ocean services, 224 S. Clark st. Chic.

Japan. 1914. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

KANSAS

Kansas, a small story of a great state. n. d. Santa Fe, 1115 Railway exchange, Chic.

Kansas, the nation's granary. The Southwest trail for Feb. 1916. Rock Island lines, Chic.

KENTUCKY

Book of Louisville and Kentucky. 1915. Convention and publicity league, Louisville. 25c. Also other publications.

Kentucky. n. d. Southern R. R. Wash.

LABRADOR

Newfoundland and Labrador. n. d. Reid Newfoundland co. St. John's.

LOUISIANA

Agricultural resources and possibilities of Louisiana. n. d. Southern Pacific R. R. St. Louis, Mo.

Down to brass tacks. 1914. Ass'n of commerce, New Orleans. Also publishes guide book of New Orleans, n. d. and other publications.

Handbook of Louisiana. 1912. State board of agric. and immigration, Baton Rouge. Also other publications.

New Orleans for the tourist. 1912. Ill. central R. R. Chic. Also publishes New Orleans, old and new. c1914.

Port of New Orleans. n. d. Board of commissioners of the port of New Orleans, New Orleans. Also other publications.

MARYLAND

Baltimore, port, terminal, and general business advantages. n. d. Municipal factory site commission, City hall, Baltimore.

Maryland, its lands, products and industries, 1916. Bur. of immigration, Baltimore.

MASSACHUSETTS

Fall River and its manufactories 1803-1914. 1915. G. M. Haffards and co. Fall River.

The port of Boston, U. S. A. 1915. Commission on waterways and public lands. Bost.

MEDITERRANEAN

The Mediterranean. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

MEXICO

Mexico. 1914. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Mexico; general descriptive data. (latest ed.) Pan Amer. union, Wash. Also distributes map prepared in War college div. of the War dep't, 1915. Size 34 by 47 in. 25c and a new commercial atlas map of Mexico, 1914.

MICHIGAN

Beautiful Detroit. n. d. Convention and tourists' bur. Detroit.

Michigan, agricultural, horticultural, and industrial advantages. 1916. Immigration commission, Lansing.

A remarkable city, Grand Rapids. 1915. Ass'n of commerce, Grand Rapids. Also publishes Grand Rapids progress, monthly, and other publications.

Soo power. n. d. Civic and commercial ass'n, Sault Ste Marie. Also other publications.

MINNESOTA

Duluth. n. d. Commercial club, Duluth. Also other publications.

Minneapolis. n. d. Civic and commerce ass'n, Minn. Also other publications.

Minnesota. n. d. Northern Pacific R. R. St. Paul.

Saint Paul, the gateway to the great northwest. n. d. Ass'n of commerce, St. Paul. Also other publications.

MISSISSIPPI

Mississippi. n. d. Southern R. R. Wash.

Mississippi, a wonderful agricultural state. n. d. Ill. central R. R. Chic. Also publishes Vicksburg for the tourist. n. d. and other publications.

Mississippi River

The Mississippi river scenic line. n. d. Burlington route, Chic.

On the Mississippi. n. d. Streckfus steamboat line, St. Louis, Mo. Also other publications.

Missouri

A city worth seeing. c1916. Business men's league, St. Louis.

Kansas City, the heart of America; what it is, where it is, how it is. n. d. Commercial club, Kansas City. Also other publications.

Trade and commerce of St. Louis (latest rep't) Merchant's exchange, St. Louis. Description of industries and statistics.

Montana

The resources and opportunities of Montana. 1915. Dep't of agric. and publicity, Helena.

Mount Rainier National Park

General information regarding Mount Rainier national park. (annual) Interior dep't, Wash. Contains bibliography.

Map of Mount Rainier national park. Geol. sur. Wash. 10c. 20 by 18½ inches; scale 1 mile to the inch.

Rainier national park, Washington. c1916. Chic. Milwaukee and St. Paul R. R. Chic.

National Parks

Glimpses of our national parks by Robert S. Yard. 1916. Interior dep't, Wash.

"Contains descriptions of the most important features of the principal national parks and the Grand canyon of the Colorado."

The National park service of the Interior dep't, Wash. expects to have a number of sets of photographs for circulation all over the country the first of the year (1917).

Nebraska

Resources of Nebraska. 1915. Bull. 31. State dep't of labor, Lincoln. Also other publications.

Netherlands

Holland. 1914. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Through Holland. 1914. Netherland state R. R. and Flushing royal mail route, 334 Fifth ave. N. Y. Also other publications.

New Brunswick

New Brunswick. 1914. Interior dep't, Ottawa, Can.

Opportunities in New Brunswick. 1916. Dep't of agric. Fredericton. Also other publications.

New Hampshire

White mountains of New Hampshire. 1916. Boston and Maine R. R. Bost.

New Jersey

Along the shore and in the foothills. n. d. New Jersey central, 143 Liberty st. N. Y. 4c. Also other publications.

New Mexico

New Mexico, its resources in public lands, agriculture, horticulture, stock-raising, coal, copper, gold and other minerals. 1916. State land office, Santa Fe. Also other publications.

Old-new Santa Fe and round about. n. d. Santa Fe, Topeka, Kan.

Picturesque New Mexico. 1916. Commissioner of public lands, Santa Fe. Also other publications.

New York

The cathedral of commerce by S. P. Cadman. 1916. F. W. Woolworth co. Woolworth bldg, N. Y.

Describes the Woolworth building, the highest building in the world giving views of New York city from the observation tower. 15c.

Central park, a guide and a history. n. d. Fifth avenue coach co. N. Y.

The Hudson river. n. d. N. Y. central lines. N. Y. Also publishes The Adirondacks. n. d. The Catskill mountains. n. d. Grand central terminal. n. d. Niagara falls. n. d. and other publications.

Hudson river by daylight. n. d. Hudson river day line, Desbosses st. pier. N. Y. Also publishes a map folder, The historic Hudson. n. d.

New York. Mar. 1912. Journal of geography, Appleton, Wis. 15c. Entire number devoted to articles on New York state.

Your stupendous New York; its strategic center. Central mercantile ass'n, 111 Fifth ave. N. Y.

New Zealand

Information relative to the port of Wellington, N. Z. Yearbook (latest ed.) Wellington harbour board, Wellington.

New Zealand, its resources, industries, and trade, by H. D. Baker. 1912. Special consular rep't 57. Bur. of foreign and domestic commerce, Wash. Sup't of doc. Wash. 15c.

NEWFOUNDLAND

Commerce and industries of Canada and Newfoundland by A. G. Robinson. 1913. Special agents' ser. 76. Foreign and domestic commerce bur. Wash. Sup't of doc. Wash. 10c.

Newfoundland and Labrador. n. d. Reid Newfoundland co. St. John's.

NORTH CAROLINA

North Carolina. n. d. Southern R. R. Wash. Also other publications.

North Carolina, a land of opportunity. n. d. Dep't of agric. Raleigh. Also other publications.

NORTH DAKOTA

North Dakota and her magnificent resources. n. d. Dep't of agric. Bismark. Also other publications.

Distributes a map of the state, scale 21 miles to the inch. 2c.

NORWAY

Bennett's travel in Norway. (latest ed.) Distributed by Scandinavian-Amer. line. 1 Broadway, N. Y. Also distributes Traveller's guide. n. d.

Norway, nature's wonderland. n. d. Norwegian America line, 8-10 Bridge st. N. Y. Also other publications.

To the midnight sun. c1913. Hamburg Amer. line, 41-45 Broadway, N. Y. Also other publications.

NOVA SCOTIA

Nova Scotia. 1914. Interior dep't, Ottawa, Can. Also publishes Nova Scotia, its resources and possibilities. 1914, and other publications.

Storied Halifax. 1916. Canadian gov't R. R. Halifax. Not seen.

OHIO

Cleveland the meeting place of business. n. d. Chamber of commerce, Cleveland. Also publishes A trip to Cleveland. n. d.

Columbus, Ohio. c1914. Chamber of commerce, Columbus. Also other publications.

OKLAHOMA

Mineral resources of Oklahoma by C. W. Shannon. 1914. Geol. sur. Norman.

The state of Oklahoma. n. d. Santa Fe, 1115 Railway exchange. Chic.

ONTARIO

Ontario, Canada. 1913. Dep't of agric. Toronto. Also publishes Northern Ontario, Canada. 1916. and Opportunities in Ontario. 1916.

Toronto, a city of opportunities. 1912. Toronto harbor commissioners, Toronto. Also other publications.

OREGON

The central Oregon empire. n. d. Spokane, Portland and Seattle R. R. co. Portland.

The economic geological resources of Oregon. 1912. State bur. of mines, Corvallis.

Portland, Oregon. n. d. Oregon-Washington R. R. and navigation co. Portland. Also other publications.

The state of Oregon, its resources and opportunities. 1915. State immigration commission, Portland. Also publishes Oregon album, 1913, which contains 190 pictures illustrating the agricultural resources and scenery of the state.

PALESTINE

The holy land. 1915. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

PANAMA CANAL

Official handbook of the Panama canal. 1915. The Panama canal, Canal Zone.

Panama; general descriptive data. (latest ed.) Pan Amer. union, Wash.

The story of Panama. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

PENNSYLVANIA

A friendly guide-book to Philadelphia. 1916. John Wanamaker, Phil.

Pennsylvania and its manifold activities. 1912. Permanent internat'l ass'n of navigation congresses, Rooms 348, 351, The Bourse, Phil. Also other publications.

See Pittsburgh first. 1916. Chamber of commerce, Pittsburgh.

PERU

Peru; general descriptive data. (latest ed.) Pan Amer. union, Wash.

PHILIPPINE ISLANDS

Commerce and industries of Alaska, Hawaii, Porto Rico, and the Philippine islands. 1913. Special agents ser. 67. Bur. of foreign and domestic commerce, Wash. Sup't of doc. Wash. 10c.

The Philippine islands. 1915. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

List of United States government publications on insular possessions. 1915. Sup't of doc. Wash.

PORTO RICO

Commerce and industries of Alaska, Hawaii, Porto Rico, and the Philippine islands. 1913. Special agents ser. 67. Bur. of foreign and domestic commerce, Wash. Sup't of doc. Wash. 10c.

QUEBEC

Canada, eastern Quebec. 1915. Interior dep't, Ottawa. Also publishes Canada, western Quebec. 1914, and other publications.

Illustrated description of the city of Quebec and the surrounding country. n. d. Quebec central R. R. Sherbrooke.

Montreal, the gateway to Canada. n. d. Rutland R. R. Rutland, Vt.

ROCKY MOUNTAIN NATIONAL PARK

General information regarding Rocky mountain national park. (annual) Interior dep't, Wash.

RUSSIA

Commercial Russia. n. d. Amer. Russian chamber of commerce, 60 Broadway, N. Y. Also other publications.

Russia. 1916. Guaranty trust co. 140 Broadway, N. Y.

Russia, a handbook on commercial and industrial conditions by John H. Snodgrass and others. 1913. Special consular rep'ts 61, Bur. of foreign and domestic commerce, Wash. Sup't of doc. Wash. 50c.

Russia and the imperial Russian government. 1916. Nat'l city bank, N. Y.

SAHARA

The great Sahara, a hot desert by Marion Weller. 1912. Bull. v. 9, no. 4. Northern Ill. state normal school, DeKalb, Ill.

SCOTLAND

Scotland, the land of song and scenery. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Tours in Scotland. 1913. Thos. Cook and son, 245 Broadway, N. Y.

The traveller's guide. n. d. Scandinavian-Amer. line, 1 Broadway, N. Y.

Description of Edinburgh.

SEQUOIA NATIONAL PARK

Forests of Yosemite, Sequoia, and General Grant national parks by C. L. Hill. 1916. Interior dep't, Wash. Sup't of doc. Wash. 20c.

General information regarding Sequoia and General Grant national parks. (annual) Interior dep't, Wash. Contains bibliography.

SOUTH AFRICA

Comprehensive guide to South and East Africa. Royal mail steam packet co. 26 Broadway, N. Y. 42c. Not seen.

SOUTH AMERICA

Latin America; general descriptive data. 1916. Pan Amer. union, Wash. Also distributes a map showing railroads of Latin America in operation and under construction. 1913, and other publications.

New colored map by Alexander Gross. 1915. Pan Amer. union, Wash. 25c.

Shows countries, capitals, railways, roads, wireless stations, submarine cables, steamer routes. Size 30 by 40 inches.

South America tours. n. d. Amer. express co. 65 Broadway, N. Y.

World race for rich South American trade by C. L. Chandler. 1913. 63rd cong. 1st sess. Senate doc. 208. Sup't of doc. Wash. 5c.

SOUTH CAROLINA

South Carolina. n. d. Southern R. R. Wash.

Yearbook of South Carolina. (latest ed.) Dep't of agric. commerce, and industries, Columbia. Also other publications.

SOUTH DAKOTA

South Dakota. (latest ed.) Dep't of immigration, Pierre, Also publishes a map of the state and other publications.

SPAIN

Spain and Gibraltar. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

Tours in Spain and Morocco. n. d. Thos. Cook and son, 245 Broadway, N. Y.

SWEDEN

Tours in Sweden. n. d. Scandinavian-Amer. line, 1 Broadway, N. Y. Also publishes a pamphlet on Stockholm. n. d. and Traveller's guide, n. d.

SWITZERLAND

Switzerland. 1911. Swiss federal R. R. 241 Fifth ave. N. Y. Also many other publications. 5c. Has for loan Swiss lantern slides.

Switzerland, the land of scenic splendours. 1913. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

TENNESSEE

Map of Tennessee. 1913. Dep't of agric. and bur. of immigration, Nashville. Showing agricultural resources, counties, railways, post offices, public highways, rivers, soil formation, location of coal, phosphate, copper, and other materials.

Tennessee, the new land of Canaan. n. d. Dep't of agric. Nashville. Also other publications.

Periodical—The resources of Tennessee. (quarterly) State geol. sur. Nashville. 8c a year.

Texas

Galveston. n. d. Commercial ass'n, Galveston. Also other publications.

Illustrated city book of Houston. 1916. Chamber of commerce, Houston.

San Antonio. n. d. Chamber of commerce and business men's club, San Antonio. Also other publications. Free to teachers.

Studies in the industrial resources of Texas. 1915. Bull. 1915. no. 3. Univ. of Texas, Austin. 15c.

Texas, an agricultural empire. c1911. Missouri, Kansas and Texas R. R. St. Louis, Mo. Also other publications.

Texas, an agricultural empire. n. d. Rock Island lines, Chic. Also other publications.

United States

Folder, Southern Pacific S. S. lines, 366 Broadway, N. Y. Contains maps of mouths of Mississippi, New York harbor, etc.

Maps of different states showing the state capital, county seats, railroads, canals, county boundaries, swamp and prairie lands, bird reservations, Indian reservations, and life-saving stations. Excepting Alaska they are on a scale of 12 miles to the inch. Order from Sup't of Documents, Wash. D. C.

Alabama. 1915. 25c.
Alaska. 1910. Scale 60 miles=1 inch. 25c.
Arizona. 1912. 25c.
Arkansas. 1914. 25c.
California. 1913. 2 sheets. 50c.
Colorado. 1910. 25c.
Florida. 1911. 25c.
Hawaii. 1901. 25c.
Idaho. 1913. 25c.
Illinois. 1911. 25c.
Indiana. 1886. 25c.
Iowa. 1885. 25c.
Kansas. 1912. 25c.
Louisiana. 1916. 25c.
Michigan. 1904. 25c.
Minnesota. 1905. 25c.
Mississippi. 1890. 25c.
Missouri. 1911. 25c.
Montana. 1911. 25c.
Nebraska. 1909. 25c.
Nevada. 1914. 25c.
New Mexico. 1912. 25c.
North Dakota. 1910. 25c.
Ohio. 1910. 25c.
Oklahoma. 1914. 25c.
Oregon. 1910. 25c.
South Dakota. 1910. 25c.
Utah. 1915. 25c.
Washington. 1909. 25c.
Wisconsin. 1896. 25c.
Wyoming. 1912. 25c.

URUGUAY

Uruguay; general descriptive data. (latest ed.) Pan Amer. union, Wash.

UTAH

Biennial rep't. 1913. Utah conservation commission, Salt Lake City.

Salt Lake City and the state of Utah. n. d. Commercial club publicity bur. Salt Lake City.

Scenic Colorado and Utah. n. d. Burlington route, Chic.

VENEZUELA

Venezuela; general descriptive data. (latest ed.) Pan Amer. union, Wash. Also publishes Commerce of Venezuela. (latest ed.)

VERMONT

Vermont, Green mountains, Lake Champlain. n. d. Rutland R. R. Rutland.

VIRGINIA

The beautiful caverns of Luray. c1906. Luray caverns corporation, Luray.

Handbook of Virginia. 1915. Dep't of agric. and immigration, Richmond.

Richmond, Virginia, yesterday and today. 1915. Chamber of commerce, Richmond.

Virginia. n. d. Southern R. R. Wash.

WASHINGTON (State)

Along the Columbia river to the sea. n. d. Spokane, Portland and Seattle R. R. Portland, Ore. Also other publications.

Annual rep't. (latest) Port of Seattle commission, Seattle. Also publishes bulletins.

Beauties of Puget sound; folder. n. d. Puget sound navigation co. Colman dock. Seattle. Also other publications.

The beauties of the state of Washington by Harry F. Giles. 1915. Bur. of statistics and immigration, Olympia. Also publishes Homeseekers' guide to the state of Washington, by Harry F. Giles. 1915, and other publications.

Pacific northwest. 1915. Northwestern R. R. Chic. 4c.

Puget sound and Alaska. n. d. Northern Pacific R. R. St. Paul, Minn. Also publishes Spokane and the inland empire. n. d. and other publications.

Yakima valley, Washington. n. d. Yakima commercial club, North Yakima.

WISCONSIN

The climate of Wisconsin and its relation to agriculture by A. R.

Whitson and O. E. Baker. 1912. Bull. 223. Agric. exp. sta. Madison. Also publishes A personal word with the home-seeker. 1916, and other publications and a map.

Milwaukee, the great manufacturing center of America. n. d. Merchants and manufacturers ass'n, Milwaukee. Also other publications.

Through picturesque Wisconsin. n. d. Northwestern line, Chic. 2c.

WYOMING

Map of Wyoming, resources. n. d. State board of immigration. Cheyenne. On back of map illustrations and description of resources.

YELLOWSTONE NATIONAL PARK

Fossil forests of the Yellowstone national park by F. H. Knowlton. 1914. Interior dep't, Wash. Sup't of doc. Wash. 10c.

General information regarding Yellowstone national park. (annual) Interior dep't. Wash. Contains bibliography.

Geological history of the Yellowstone national park by Arnold Hague. 1912. Interior dep't, Wash. Sup't of doc. Wash. 10c.

Map of Yellowstone national park. Geol. sur. Wash. 25c. 28½ by 32 inches; scale 2 miles to the inch.

Yellowstone national park. n. d. Northern Pacific R. R. St. Paul, Minn. Also publishes The land of geysers, 1916, and A panoramic picture of the park in colors 10c. and other publications.

Yellowstone national park. 1915. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

YOSEMITE NATIONAL PARK

Forests of Yosemite, Sequoia, and General Grant national parks by C. L. Hill. 1916. Interior dep't, Wash. Sup't of doc. Wash. 20c.

Map of Yosemite national park. Geol. sur. Wash. 25c. flat; 40c. folded and bound between covers. 28½ by 27 inches; scale 2 miles to the inch. Also distributes a Map of Yosemite valley. 10c. 35 by 15½ inches; scale 2,000 feet to the inch.

Panoramic view of Yosemite national park prepared by J. H. Renshaw. 1914. Sup't of doc. Wash. 25c. 18½ by 18 inches; scale 3 miles to the inch.

The Yosemite valley. 1916. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

INDUSTRIES AND COMMERCIAL PRODUCTS

Bibliography

Commerce and manufactures as reported and tabulated in government publications. 1914. Sup't of doc. Wash.

ALUMINUM

Methods of working aluminum. 1913. Aluminum co. of America, Westminster bldg, Chic.

ASPHALT

The wonderland of Trinidad. n. d. Barber asphalt paving co. Land title bldg, Phil. Also publishes Trinidad and Bermudez lake asphalts and their use in highway construction by Clifford Richardson and other publications.

BOOKS

The biography of a book. n. d. Harper and brothers, N. Y.

The story of the making of a book. c1914. Charles Scribner's sons, N. Y.

BREAD

Story of bread. c1911. Internat'l harvester co. of America, inc. Agric. ext. dep't, Harvester bldg, Chic. 5c.

Story of the staff of life. c1911. Nat'l ass'n of master bakers, 908 Royal insurance bldg, Chic.

CHOCOLATE

Cacao culture by O. W. Barrett. 1913. Bur. of agric. Manila, P. I. Reprint from Philippine agric. rev. Jan. 1914.

Cocoa and chocolate. c1910. Walter Baker and co. ltd. Dorchester, Mass.

COAL

Diagram of the products derived from coal and some of their uses. c1916. The Barrett co. 608 Laclede gas bldg, St. Louis, Mo. or 17 Battery place, N. Y.

COCOA

Cocoa production and trade. 1912. Special consular rep'ts 50. Bur. of manufactures, Wash. Sup't of doc. Wash. 5c.

COFFEE

Coffee from tree to lip. 1905. C. F. Blanke tea and coffee co. 7th and Clark ave. St. Louis, Mo. 6c.

Coffee, production, trade, and consumption by countries, by H. C. Graham. 1912. Bull. 79. Bur. of statistics, Dep't of agric. Wash. Sup't of doc. Wash. 15c.

Coffees, teas, and spices from plantation to dealer. n. d. Dwinell-Wright co. 311-319 Summer st. Bost. Also other publications.

Notes on coffee in Java by P. J. Wester. 1916. Bur. of agric. Manila, P. I. Reprint from Philippine agric. rev. 2nd quarter 1916. Also publishes Coffee in the Philippines by P. J. Wester. 1915. Reprint from Philippine agric. rev. 1st quarter, 1915.

CORN

School lessons on corn by C. H. Lane. 1914. Farmers' bull. 617. Dep't of agric. Wash. Sup't of doc. Wash. 5c.

COTTON

Cotton. 1909. Pan Amer. union, Wash.

Cotton growing. (latest ed.) by D. A. Tompkins, Charlotte, N. C. 2c. Also other publications.

Lessons on cotton for the rural common schools by C. H. Lane. 1915. Dep't bull. 294. Dep't of agric. Wash. Sup't of doc. Wash. 5c.

COTTON GIN

A short story of Eli Whitney. n. d. Wyman and Gordon, Worcester, Mass.

COTTON MANUFACTURE

Manufacture of cotton into cloth. n. d. Pacific mills, Lawrence, Mass.

Views and statistics of the Amoskeag manufacturing co. n. d. Amoskeag mfg. co. Manchester, N. H. Contains pictures of cotton and woolen manufacturing.

FISHERIES

Alaska fisheries and fur industries. 1914. Bur. of fisheries. Wash. Supt. of doc. Wash. 15c.

Sea fisheries of eastern Canada. 1912. Commission of conservation, Ottawa, Can.

FLAX

Fiber flax by Frank C. Miles. 1915. Farmers' bull. 669. Dep't of agric. Wash. Sup't of doc. Wash. 5c.

Flax culture; extracted from report of H. L. Balley by W. L. Marcy. 1907. Farmers' bull. 274. Agric. dep't, Wash. Sup't of doc. Wash. 5c.

FLOUR

Chart showing 24 samples of wheat in process of manufacture with description of different processes. Northwestern consolidated milling co. Minn.

Making the finest flour in the world. c1912. Bay state milling co. Winona, Minn.

The manufacture of wheat flour. 1916. Russell-Miller milling co. Minn. Also sends samples of silk bolting cloth used in the purification of wheat flour.

The wheat and flour primer. c1910. Washburn-Crosby co. Minn.

Fur Farming

Alaska fisheries and fur industries. 1914. Bur. of fisheries, Wash. Sup't of doc. Wash. 15c.

Fur farming in Canada by J. W. Jones. 1913. Commission of conservation, Ottawa, Can. 50c.

Harvesting

Harvest scenes of the world. c1913. Internat'l harvester co. of America, inc. Agric. ext. dep't, Harvester bldg, Chic. 50c.

Iron and Steel

Some aspects of iron and steel industry in Europe. 1915. Special consular rep't 71. Bur. of foreign and domestic commerce. Wash. Sup't of doc. Wash. 5c.

Jute

Linen, jute and hemp industries in the United kingdom by W. A. G. Clark. 1913. Special agents ser. 74. Bur. of foreign and domestic commerce, Wash. Sup't of doc. Wash. 25c.

Linens

Development of American linen industry by W. A. Graham Clark. 1916. Special agents ser. 122. Foreign and domestic commerce bur. Wash. Sup't of doc. Wash. 5c.

Lumbering Industry

Lumbering industry of Philippines by John R. Arnold. 1914. Special agents ser. 88. Foreign and domestic commerce bur. Wash. Sup't of doc. Wash. 5c.

Post cards on lumbering. 24 in a set. 5c ea. Public library, Eau Claire, Wis.

Meat Industry

Meat production in Australia and New Zealand by E. C. Joss. 1914. Yearbook separate 650. Dep't of agric. Wash. Sup't of doc. Wash. 5c. Also publishes Meat production in Argentine by A. D. Melvin. 1914. Yearbook separate 648. Sup't of doc. Wash. 5c. Both from Yearbook of Dep't of agric. 1914.

South American meat industry by A. D. Melvin. 1914. Yearbook separate 629. Dep't of agric. Wash. Sup't of doc. Wash. 5c. From Yearbook of Dep't of agric. 1913.

Mining

Mining in the federated Malay states by D. C. Alexander, jr. 1912. Special agents ser. 59, Bur. of manufactures, Wash. Sup't of doc. Wash. 5c.

NEWSPAPERS

The making of a great newspaper. n. d. N. Y. world, N. Y.

NITRATES

The great nitrate fields of Chile. 1909. Pan Amer. union, Wash.

A review of our present knowledge of sodium nitrate by William S. Meyers. n. d. Chilean nitrate of soda propaganda, 17 Madison ave. N. Y.

OLIVES

The olive and its oil. n. d. H. J. Heinz co. Pittsburgh, Pa.

PAPER

Manufacture of paper; brief history of the industry and general description of processes. 1914. Labor bull. 103, p. 72-83. Bur. of statistics, State house, Bost. 9c.

PEANUTS

Peanuts and their possibilities for the grower and manufacturer. n. d. Central of Georgia R. R. Savannah, Ga.

PENCILS

How Eberhard Faber pencils are made. n. d. Eberhard Faber, 37 Greenpoint ave. Brooklyn, N. Y.

Pencil geography. c1904. Joseph Dixon crucible co. Jersey City, N. J. Free to teachers.

PRINTING

Mergenthaler linotypes. c1913. Mergenthaler linotype co. Tribune bldg, N. Y.

RAISIN INDUSTRY

Raisin industry by G. C. Husman. 1916. Dep't bull. 349. Dep't of agric. Wash. Sup't of doc. Wash. 10c.

RICE

Irrigation practice in rice growing by C. G. Haskell. 1915. Farmers' bull. 673. Dep't of agric. Wash. Sup't of doc. Wash. 5c.

The milling of rice and its mechanical and chemical effects upon the grain by F. B. Wise and A. W. Bromell. 1916. Dep't bull. 330. Dep't of agric. Wash. Sup't of doc. Wash. 10c. Primitive and modern methods of milling rice.

Rice and rice cookery by Miriam Birdseye. Cornell reading course. Jan. 1, 1914. Reprinted and distributed by The rice millers ass'n, room 209, Kyle bldg, Beaumont, Texas. Also other publications.

ROPE

The story of rope. 1916. Plymouth cordage co. North Plymouth, Mass.

Rubber

Booklet on rubber. Goodyear tire and rubber co. Akron, O.

Rubber and some facts about it. n. d. Firestone tire and rubber co. Akron, Ohio.

Rubber from forest to foot. c1913. United States rubber co. Broadway at 58th st. N. Y. Also other publications.

The story of rubber from discovery to the present day. n. d. Hood rubber co. Watertown, Mass.

Salmon

Salmon fisheries of the Pacific coast. 1911. Fisheries bur. Wash. Sup't of doc. Wash. 15c.

Salt

A little visit to the home of Worcester salt. n. d. Worcester salt co. 71-73 Murray st. N. Y. Illustrated description of salt manufacture.

Ship Building

Aquitania, the making of a mammoth liner by E. K. Chatterton. n. d. Cunard S. S. co. ltd. Tourist dep't, 21-24 State st., N. Y.

Silk

Silk culture and manufacturing shown progressively. n. d. Belding brothers, 201 W. Monroe st. Chic. Also publishes The story of a silk mill by Bruce Calvert. c1914.

The silk industry, from the worm to the wearer. n. d. M. Heminway and sons silk co. 890 Broadway, N. Y. 2c.

Silk, its origin, culture and manufacture. c1911. Corticelli silk mills, Florence, Mass. pap. 10. cloth 24c.

Silk, the real versus the imitation. c1909. Brainerd and Armstrong co. New London, Conn. 6c.

The silkworm, its history and product. c1915. Winsted silk co. Chic.

The story of silk and Cheney silks by H. H. Manchester. c1916. Cheney bros. South Manchester, Conn.

Sponges

Sponge culture by Jules Cotte. 1908. Doc. 670. Bur. of fisheries. Wash.

Sugar

A century of sugar refining in the U. S. 1816-1916. 1916. Amer. sugár refining co. 117 Wall st. N. Y.

Sugar industry, sugar cane and cane sugar in Louisiana. 1913. Misc. ser. 9. Foreign and domestic commerce bur. Wash. Sup't of doc. Wash. 15c.

TEA

Coffees, teas, and spices from plantation to dealer. n. d. Dwinell-Wright co. 311-319 Summer st. Bost. Also other publications.

Views of Lipton's Ceylon tea estates. n. d. Thomas J. Lipton, Chic. or N. Y.

TURPENTINE

The naval stores industry by A. W. Schorger and H. S. Betts. 1915. Dep't bull. 229. Dep't of agric. Wash. Sup't of doc. Wash. 15c.

WHEAT

Handling wheat from field to mill by L. A. Fitz. 1910. Circ. 68. Plant industry bur. Wash. Sup't of doc. Wash. 5c.

WOOLEN AND WORSTED MANUFACTURE

From wool to cloth. c1911. Amer. woolen co. Bost. 1c.

The manufacture of wool into cloth. n. d. Pacific mills, Lawrence, Mass.

YERBA MATE

Yerba mate: the tea of South America. 1916. Pan Amer. union, Wash. Reprint from Pan Amer. bull. May 1916. Describes the processes of gathering and curing the leaves.

MISCELLANEOUS

ATMOSPHERE

Stories of the atmosphere by Roscoe Nunn. 1916. Yearbook separate 680. Dep't of agric. Wash. Sup't of doc. Wash. 5c. From Yearbook of Dep't of agric. for 1915.

BIG TREES

Secret of the big trees, Yosemite, Sequoia, and General Grant national parks by Ellsworth Huntington. 1913. Interior dep't. Wash. Sup't of doc. Wash. 5c.

CLIFF-DWELLERS

Haunts of primitive man. n. d. Santa Fe, 1115 Railway exchange, Chic.

GEYSERS

Geysers by Walter H. Weed. 1912. Dep't of the interior, Wash. Sup't of doc. Wash. 10c.

"In this pamphlet is a description of the forces which have produced the geysers, and the geysers of the Yellowstone are compared with those in Iceland and New Zealand."

MAPS

How to use desk and wall outline maps by L. P. Denoyer. n. d. A. J. Nystrom and co. 623 S. Wabash ave. Chic. Also publishes How to use blackboard outline maps by L. P. Denoyer and A. H. Sanford. n. d.

List of inexpensive maps published by national and state departments; compiled by Univ. of Ill. library school in Univ. of Ill. School of educ. Bull. 15. p. 23-27. Univ. of Ill. Urbana. These maps were on exhibition at the High school conference held at the University of Illinois, November 1915.

Maps published by the government of the United States. 1916. Sup't of doc. Wash.

Publications of the United States government relating to climate, earthquakes, floods, etc. 1916. Sup't of doc. Wash.

PICTURES

Report of the committee on instruction by means of pictures. 1913. School doc. no. 6, 1913. Boston public schools, Bost.

PORTS

The premier warehouses and terminals. c1911. N. Y. dock co. 10 Bridge st. N. Y.

Comparative study of the economic, industrial and commercial conditions in the free ports of Europe and the port of New York by Philip B. Kennedy. 1914. Merchants' ass'n of N. Y. 233 Broadway, N. Y.

RAILROADS

The New York central railroad, 1831-1915. n. d. N. Y. central R. R. N. Y.

See America, an historical and geographical treatise on the Baltimore and Ohio railroad. 1916. Baltimore and Ohio R. R. Baltimore, Md.

The dawn of the electrical era in railroading. n. d. Chic. Milwaukee, and St. Paul R. R. Chic.

TIME

Keeping time. 1917. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

TRANSPORTATION

Principal transportation routes of the world. Sup't of doc. Wash. 25c. Size 22 by 53 inches.

List of United States public documents relating to railroads, merchant marine, postal service etc. 1915. Sup't of doc. Wash.

WATER POWER

Electric power from the Mississippi, a description of the water-power development at Keokuk, Iowa. 1913. Mississippi river power co. Keokuk, Iowa.

WEATHER

The weather. 1916. Mentor ass'n, inc. 52 E. 19th st. N. Y. 15c.

WEATHER FORECAST

Forecasting the weather by George S. Bliss. 1913. Bull. 42. Weather bur. Wash. Sup't of doc. Wash. 5c.
"An elementary instructive pamphlet for popular use."

EDUCATIONAL EXHIBITS

This list has been complied from answers to letters sent out to practically all of the American firms listed as well as to others not listed. Some of the exhibits cost too much for small schools but are included to make the list useful to large schools.

GENERAL

Scientific supply co. 627 Central nat'l bank bldg, St. Louis, Mo. Opto industrial collections of 39 exhibits. Write for price.

Ward's natural science establishment, 84-102 College ave. Rochester, N. Y. General economic collections for sale. Send for catalog.

ASBESTOS

Keasbey and Mattison co. Ambler, Pa. Samples of crude asbestos, carded fiber and finished product. Free.

BAKING POWDER

Royal baking powder co. 135 William st. N. Y. Exhibits of cream of tartar in its different stages. Free to schools in which domestic science is taught.

COCOA AND CHOCOLATE

Walter Baker and co. ltd, Milton, Mass. Free to schools.

Hershey chocolate co. Hershey, Penn. Shows the process of cocoa manufacture from the bean in its natural state to the finished product. Free.

The Walter M. Lowney co. 486 Hanover st. Bost. Showing cocoa from the raw bean to the finished product. Free.

COFFEE

C. F. Blanke tea and coffee co. 7th and Clark ave. St. Louis, Mo. About 25 bottles showing the various stages that coffee passes through from the time it leaves the plantation until it is ready for use; contains also samples of different varieties of tea. $3.00, freight collect.

Nat'l coffee roasters ass'n, 39 Old slip, N. Y. Educational school exhibit containing samples of coffee in the bean, in the cherry, etc. and five samples of ground coffee with photographs of coffee culture and shipping. $1.00, express collect.

CORK

Armstrong cork co. Pittsburgh, Penn. Collection showing corkwood in various stages of manufacture. $1.00.

CORN

American manufacturers' ass'n of products from corn, 208 S. La Salle st. Chic. 50c.

FERTILIZERS

Swift and co. Fertilizer dep't, National stock yards, Ill. Samples showing by-products of the packing industry and fertilizer made from them. Free.

FLOUR

Pillsbury flour mills co. Minn. Consists of twelve samples showing the different stages of flour manufacture. Free, express charges to be guaranteed by applicant; weight about 6 lbs. Sent only to schools, colleges, or other educational institutions.

Russell-Miller milling co. Minn. Seven bottles showing the results of the many intricate processes of cleaning, washing and scouring the wheat; grinding, separating and purifying the flour stocks in the manufacture of flour. Sent only to teachers.

Washburn-Crosby co. Advertising dep't, Minn. Illustrates the different stages of wheat as it is manufactured into flour. Also charts showing dissected wheat kernel and a sectional view of simplified flour mill.

GRAIN

Postum cereal co. ltd, Battle Creek, Mich. Fourteen bottles showing the different stages in the process of manufacturing their products from wheat, corn, rice and barley. Free, charges prepaid.

Quaker oats co. Chic. Twenty-eight samples of grains, finished products and by-products.

LEATHER

Pfister and Vogel leather co. 447 Virginia st. Milwaukee, Wis. Sample folder of different kinds of leather to show how leather is tanned. 25c.

MILK, MALTED

Horlick's malted milk co. Racine, Wis. Exhibit shows wheat, flour, barley and barley malt. Free.

PAPER

Strathmore paper co. Mittineague, Mass. Three bottles containing rags, half stock, and jordon stock, showing paper in process of manufacture.

PEANUT BUTTER

Beech-nut packing co. Canajoharie, N. Y. Exhibit of peanut butter showing the peanuts and the little acrid heart which is extracted during the course of manufacture. Free to teachers.

PENCILS

Joseph Dixon crucible co. Jersey City, N. J. From crude graphite and cedar strips to the finished product. 24c.

Eberhard Faber, 37 Greenpoint ave. Brooklyn, N. Y. Steps in the manufacture of a pencil from crude graphite and cedar strip to the finished product. Free. Furnished only to large schools and libraries, etc. as supply is limited.

PENS

Esterbrook steel pen mfg. co. Camden, N. J. Shows by samples the steps in the manufacture of pens from the sheet steel to the finished product. 10c.

Spencerian pen co. 349 Broadway, N. Y. Shows the different processes in making pens. 25c.

PETROLEUM

Standard oil co. mfg. dep't, 26 Broadway, N. Y. Samples of petroleum products. Write for terms.

RUBBER

Firestone tire and rubber co. Akron, Ohio. New supply of rubber exhibits is being made.

Hood rubber co. Watertown, Mass. Shows the components used in the manufacture of rubber boots etc. $1.00.

SALT

Diamond crystal salt co. St. Clair, Mich. Contains samples of crude salt and of salt in different stages of manufacture. Free to schools on payment of parcel post charges which average about 50c.

Worcester salt co. 71-73 Murray st. N. Y. Samples of salt. Free to schools.

SILKS

Belding bros. and co. 201 W. Monroe st. Chic. $1.25.

Brained and Armstrong co. New London, Conn. Educational silk culture cabinet for school use. Contains samples of eggs of silkworm moth, silkworms at different ages, chrysalis, cocoons and the finished product. $2.50.

Cheney bros. South Manchester, Conn. Free distribution of silk exhibit has been discontinued. A few for sale $2.00.

Corticelli silk mills, Florence, Mass. Box of two cocoons, 5c; silk

The JOURNAL of GEOGRAPHY

Volume XV JUNE 1917 Number 10

FOREWORD

By Richard Elwood Dodge.
President, National Council of Geography Teachers.

THE current number of the Journal of Geography completes twenty consecutive volumes of an American periodical devoted to the problems of geographic education—a highly significant testimonial to the continued interest of the profession in one of the older subjects of the curriculum. At the suggestion of Professor W. M. Davis, then as now vitally and enthusiastically interested in the promotion of geographic education, the writer started the Journal of School Geography in 1897. At the end of five volumes, this earlier journal was combined with the Bulletin of the American Bureau of Geography, edited by Professor Edward M. Lehnerts, now of the University of Minnesota, under the present title. Professor Lehnerts and Professor Goode of the University of Chicago cooperated for some time in making the new Journal more significant, more vital and more inclusive than either of its predecessors.

The Journal of School Geography was started in the days when the new physical geography was being stressed in the elementary schools and just beginning to have a place in secondary schools, and the earlier volumes reflect that interest by their contents.

In these twenty years many other problems have come to the front and human phases of geography have been more discussed. Commercial geography began to be significant about 1900, just previous to the publication of the first high school text in 1901. The pendulum of interest has swung backward and forward until now the greater emphasis is being given to human geography in varied ways. Physical geography has been pruned and strengthened, commercial geography is being organized out of a chaos, human geography in its wider phases is coming to be significant and the promise of still greater worth to school geography has never been so encouraging as now.

During these twenty years, the several editors have tried to follow and lead, to have the Journal up to date and practical,

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Twenty years ago it seemed visionary to believe a Journal devoted to so old and time honored a subject as geography could live. Today we have special journals in several of the older fields, indicating that modern educators are not forsaking the old in their desire to promote and perfect the many new and significant subjects that have come into the elementary and secondary schools.

There have been pressing problems in geography teaching demanding consideration at all times during these two decades. Today they are as pressing as ever. General Science in its relation to geography in secondary schools is not yet solved, nor have we as yet fully considered what is the most vital and significant form of geography for secondary schools. Teachers who look ahead and who are not content with standing still, are yearning for a richer content for geography in all phases of the work. Many have shown the way toward better things but the multitude cannot follow because they dread to embark upon the unknown with their limited learning in the field.

Hence we have before us today as perhaps one of the most pressing problems in geographic education, the strengthening of geography work in Normal Schools.

What shall be the geography work in Junior High Schools? How far can the problem method be used locally? What are the possibilities of laboratory work of worth in commercial, industrial and human geography? Should the training courses for teachers in New England have a common factor with the training courses in the far west or south? How can geography be made more worth while and significant in colleges, specialized high schools, and in extension classes?

How can we make geography basal in courses in Agriculture? How can geography be applied in rural schools? What should we teach children about South America, Asia and Africa, to make them able to understand some of the pressing world problems that confront us?

These and other problems, large and small, detailing the content, scope, the spirit of the subject, and the steps of class room practice, almost overwhelm us with their multiplicity and insistance. To these and the many more problems, some of which are as yet unknown, the Journal, it is hoped, may continue to devote its attention for many volumes in the future.

LETTER TO STATE DIRECTORS OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

By GEORGE J. MILLER

Secretary of the National Council

THREE years ago last December the first step was taken to organize the National Council of Geography Teachers for the specific purpose of making the teaching of geography more effective in the schools of America. The National Council has been fully organized for two years and now has a membership of about 1000. When it began its work there was only one state organization devoted to this purpose. State Directors are now at work in 40 states, and State Councils have been established in 20 states. Organizations will be completed in four or five other states during the coming year. Several states have established district councils for the purpose of holding special meetings in various parts of the respective states. The attendance at state meetings has varied from a few to approximately 1000 in New York, and several meetings have had an attendance of 200 to 300. This certainly shows an active interest in geography teaching.

The National Council has received hearty support and cooperation from the United States Commissioner of Education, The American Geographical Society, the Association of American Geographers, and the Journal of Geography. The American Geographical Society has contributed $200 to foster the work of the National Council. It is largely through the use of these funds that the Council has been able to make such rapid progress.

The Council expects to take up one or more problems of national significance each year. A committee, of which Sumner W. Cushing, Salem, Mass., is chairman, is now at work on the problem of normal school geography. A preliminary report will be made at the meeting in Chicago next winter. This report will be of vital importance to every teacher of geography and especially to each state, as it should aid in bringing about an improvement in the preparation of teachers. Plan to be present at that meeting.

As State Directors, the success of the movement in your state rests in your hands. Several states have committees at work on important problems and their reports will soon be available. This material should be of great value to other workers. A few years of such constructive and cooperative efforts will produce results. Your Secretary wishes to suggest the following as problems that demand cooperation and united action, as they apply to nearly the whole country. You can assist the cause by starting a vigorous campaign in your state.

1. *Establish a State Council if you have not already done so.* When your organization is once established, you will have a working unit, and progress can be made. In some states "sectionalism" or "teacher politics" may be obstacles to be overcome, but continuous effort will bring success in the end. This has already been attained in some states where, at one time, success seemed hopeless. The more people you can get interested in reading, talking, and teaching geography, the sooner your state will get the benefit of this movement for better geography. The sooner you get public opinion aroused in favor of better geography teaching, the sooner geography will take its proper place in the school curriculum.

2. *Promote publicity.* This may be done by seeing to it that suitable speakers appear on the programs of all teachers' associations. State Directors are not finding this as difficult as they expected. In general the officers of state teachers' associations are ready to cooperate if your requests are possible of fulfillment. In some states a speaker has been secured for the "General Sessions" and then used in the geography section. This makes it possible to secure the financial assistance of the larger organization.

You may also give publicity to geography by directing the preparation of magazine articles for your state educational journals. Organized efforts along this line will bring excellent results and be a large factor in awakening interest. This is well illustrated by a series of articles on Home Geography by E. E. Lackey, of Wayne, Nebraska, in the educational journal of that State.

3. *Geography in the Junior High School.* The movement for the establishment of Junior High Schools is growing and now is the time to exert the best efforts of your organization in order to assure due consideration for geography. If you do not do so, geography will be crowded out by some other subject. School officials are inclined to welcome industrial, commercial, or economic geography. Here is a field that needs your immediate attention.

4. *The better preparation of teachers.* The majority of teachers of geography are prepared by normal schools. Some normal schools offer no regular courses in geography; in others the geography courses are taught by "whoever has a vacant *hour*"; in others, good courses in geography are offered but stu-

dents are not required to take them. It seems incredible that normal schools are sending out graduates to teach geography who have had no real preparation,—but such is the regretable fact. The number of normal schools giving high grade work in geography is increasing. Your State Council can petition the normal schools of your state, requesting that adequate preparation in geography be required of all graduates who expect to teach the subject. You may do still more by inviting the superintendents of your state to cooperate in making the same request of the normal schools. If it is at all possible this work should be undertaken this year or early next fall, as it will prepare the way for the report of the National Council Committee on normal school geography. Cooperative effort in this matter should produce results in a short time.

5. *Prepare a course of study.* Most school officials will welcome the assistance that you can give in outlining the geography course, especially if you have no state course, or if the present one is inadequate. You can do a great deal to mould the character of the geography work in your state by the preparation of such a course. If you do not undertake to guide the geography work of your state some one else will do so and it may be one who is not trained in geography or in full sympathy with it.

Your Secretary realizes that he is suggesting large tasks that require considerable time and effort, but he believes that when they are completed better teaching of geography will reward your efforts. If every State Council will carry out these suggestions vigorously during the coming year, results will be secured immediately that it would otherwise require years to accomplish. The officers of the National Council wish to work with you in any way possible. Let them know how they may be of assistance. They believe the most effective work along these lines can be done by state organizations. No outsider can do it so well. No better time could be selected to illustrate the great importance of our subject. Knowledge of the countries of the world is now sought by every wide-awake American. The importance of geographic knowledge in the development of national life is now being well recognized. The fact that our great nation has thrown its vast resources into the world war has awakened interest in our own country and provided a "key" to public interest that should not be allowed to pass unused. Let us make the greatest possible use of this opportunity and advance the teaching of geography rapidly, until it stands at the fore-front in our school curriculum. Let us work energetically to make the coming year a notable one in the improvement of geography teaching.

ACTIVITIES OF THE MASSACHUSETTS COUNCIL

By W. W. Atwood, Secretary

OUR two open meetings held in Boston gave us a good start. One hundred and nineteen persons joined, and most of them have become members of the National Council, so that they receive the Journal of Geography regularly. In that way they keep in immediate touch with the work of the National Council, and have the opportunity of reading the many excellent articles which the Journal publishes.

Our dues for membership in the Branch were fixed at twenty-five cents to meet the expenses of postage, stationery, and printing.

The Executive Committee now has plans well under way for a number of sectional meetings in different portions of the state. Special speakers will be sent to those meetings, and many who have not yet joined the organization will, we expect, come in at one or another of those meetings. A committee to promote the introduction of geography into the junior high schools has been appointed. Mr. Cushing of the Salem Normal School is in charge of this work, and we look forward confidently to encouraging results.

We have taken up with the officers of each of the County Teachers Associations within the state the desirability of having a paper on the teaching of geography presented at each of their meetings. We have offered to assist in securing speakers for them, and thus far have made arrangements for several such meetings.

The Executive Committee has also under consideration the publication, from time to time, of a brief bulletin to be sent to the members of the Massachusetts Branch, just to keep them in touch with matters of immediate or purely local interest.

Two larger questions occur to me which I should like to call to the attention of all members of the National Council. One pertains to the introduction of geography into the curricula of the junior high schools. If instruction in geography closes at the end of the sixth grade, the American children will secure but a very general and very elementary view of world geography. Because of the immaturity of the children the larger problems in geography will not be taken up, the study of geography as a science will be largely if not completely lost, and the organization of a great mass of facts about the different parts of the world will not be well accomplished. It seems that the greatest *educational* value of geography would be lost. Should not this organization make a definite recommendation to school administrators that a course of study in geography be fitted into the work of the seventh and eighth grades of all grammar schools, and into the curricula of every junior high school? Perhaps definite courses of instruction could be recommended.

The second question needs very careful consideration from the educational standpoint. Are not many of the teachers attempting, in our elementary schools, to teach altogether too many facts and too many phases of geography? This does not mean that too much time is given to the study of geography, but too many subjects are presented, so that mere generalizations are given to the child. Generalizations are stupid. The child wants richness of detail. Vivid pictures are needed. Are not many of the failures in the teaching of geography due to learning and reciting what to the child are meaningless generalities? In some cases the teacher may not know more than the statement that the children are required to learn, and that condition leads to a useless type of lesson. Is it more important that the children study all phases of geography and all countries, or should they know a certain amount of geography well, not just as facts to be restated, but with an appreciation of the significance of geographic conditions upon peoples, coming thereby to have a wholesome interest which may lead them to independent reading, to know more and more of other parts of the earth, and of other phases of geography than those treated in their elementary school courses?

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WORK OF THE ILLINOIS COUNCIL OF GEOGRAPHY TEACHERS

By Mabel C. Stark, Director

In October, 1915, the chairman of the National Council appointed Miss Mabel C. Stark, of the Illinois State Normal University, at Normal, Illinois, as leader for the movement in Illinois. The plan and purpose of the council was presented by the chairman at the Geography Section of the High School Conference held at the University of Illinois, November 19 and 20, 1915, also at the Earth Science Section of the Central Association of Science and Mathematics Teachers, which met in Chicago, November 26 and 27. The geographers present at these meetings put themselves on record as in hearty co-operation with the movement. Many problems pertinent to better geography teaching and more efficient geographic study were discussed at these sessions.

The first regular meeting of the Illinois Council of Geography Teachers was held in Peoria, March 16, 1916. The nucleus of this meeting consisted of eighty Peoria teachers who had become thoroughly interested in and alive to the possibilities of geography through extension work carried on in that city by instructors from the Illinois State Normal University. They carried their enthusiasm to their teacher friends so successfully that a group of over 250 crowded the lecture room of the Women Teachers' Club on the evening stated.

The Council was unusually fortunate in securing as the speaker of the evening one of the greatest geographers of the United States, Professor Rollin D. Salisbury, head of the Department of Geography in the University of Chicago. Professor Salisbury set forth in his own convincing and delightful fashion his notions as to the meaning of modern geography, its scope, and educational values, and touched upon many pressing geographical problems of today. The talk was an inspiration to the keenly interested listeners.

The social hour that followed in the parlors of the Club gave an opportunity for all to meet Professor Salisbury, and to begin a social as well as professional "geographic brotherhood."

During the first summer term at the University of Chicago, in July, 1916, many students and teachers of geography from all parts of the United States had come together for advanced study. It seemed particularly fitting to hold in Rosenwald Hall a session devoted to arousing an active interest in better geography teaching and to present the matter of the National and State Councils. While the meeting was held under the auspices of the Illinois Council many interested people of other states heard for the first time of their state council and of the national movement.

This large group of university students was addressed first by Professor Salisbury, who spoke along much the same lines as he did at the Peoria meeting. Professor R. H. Whitbeck, visiting professor from the University of Wisconsin, then spoke in considerable detail of the National and State Councils of Geography Teachers. Future plans of the Councils were spoken of somewhat, and the interest felt was measured to an extent at least by the new members added to the National and Illinois Councils through this meeting.

The next meeting of the Illinois Council of Geography Teachers was held in association with the Earth Science Section of the Central Association of Science and Mathematics Teachers, which met in Chicago, December 1 and 2, 1916.

It was quite fitting to find those interested in the Earth Sciences assembled in the lecture room of Rosenwald Hall of the University of Chicago. This beautiful and adequate building houses the geography and geology departments of the University of Chicago, which is one of the leading centers in our country for the training of geographers.

Large and interested audiences heard the addresses and took part in the discussions of both sessions. On Friday afternoon it was a privilege to hear Professor Rollin D. Salisbury, head of the department of geography of the University of Chicago, discuss "The Vocational Aspects of the Earth Sciences." Frank W. DeWolf, director of the State Geological Survey, spoke on "Geological Science as Adapted to the Development of Mineral Resources (with special reference to Illinois.)" Dr. DeWolf used the stereopticon to make his illustrations concrete.

These two principal speakers of the afternoon were followed by three high school teachers who spoke briefly on "Some Experiences in Schools Where the Junior-Senior High School is in Operation." Stanislaus Arseneau spoke of "Geography and General Science" in Decatur (Illinois) High School; D. G. MacMillan recounted some "Difficulties in Organizing the Science Work in the Junior High School" in Grand Rapids, Michigan; E. L. Mahaffy, of the High School of Commerce, Columbus, Ohio, discussed "Physical Geography in the Columbus Junior High Schools."

The committee appointed to propose a geography course for the re-organized (Junior-Senior) High School made a report of progress and were instructed to continue their study through this year. James H. Smith, Austin High School, Chicago, is chairman of this committee.

Charles R. Dryer, of Fort Wayne, Indiana, for many years a prominent thinker and writer along geographic lines, gave the principal address Saturday morning, "The Scope and Method of High School Geography." Dr. Dryer's address sparkled with pertinent contrasts between the old and the new geography. We have much to hope for from the coming geographers of our state if we may judge from the notions presented by Robert G. Buzzard in his discussion of "Geography and Boys," given from his experience in the Harvard School for Boys, Chicago.

The session closed with an informal discussion of the "Earth Sciences in the Elementary and High Schools of Tomorrow" led by Illinois Normal School Teachers of Geography.

At the recent meeting of the Illinois State Teachers' Association which meets annually in Springfield the last of December, the Illinois Council of Geography Teachers was granted the privilege of becoming a section of the association. A strong geography program will be planned for this Springfield meeting in December, 1917.

In order that teachers of Illinois may keep closely in touch with various phases of professional geography it has seemed highly desirable to issue a bulletin devoted to the discussion of such problems as confront us daily. Six bulletins have been issued up to date. Among them we make special mention of the October number, "The Illinois Centennial and the Study of Illinois" by Douglas C. Ridgley; the November number, "Geography's High School Problem" by William E. Andrews; the December number, "The Need of a General School Atlas" by J. Paul Goode; and the February number, "The Use of Local Geographic Material Illustrated by Southern Illinois Types," by Clarence Bonnell.

So many encouraging comments on the Illinois bulletin idea have reached us that the chairman hopes to make a bigger thing of this publication. Mr. Charles C. Colby of the department of geography in the University of Chicago, has promised substantial assistance in editing the bulletin, so we hope for its future.

The Illinois Council is fortunate in having an Advisory Board made up of people thoroughly interested in the advancement of geography. Professor Rollin D. Salisbury, of the University of Chicago, Professor John L. Rich, of the University of Illinois, Principal W. E. Andrews, of the Pana Township High School, and Principal Ruth Shield, of the Longfellow School, Peoria, serve in this capacity. It will be observed that grade, high school, and university geography interests are represented in the personnel of the Advisory Board.

A membership fee is necessary in order to finance the correspondence associated with the council, to publish and distribute the bulletin, and to maintain the meetings of the council. The annual fee is placed low in order that the membership may be large.

Three membership possibilities are open in the Illinois Council: (1) a fee of 25 cents for membership in the Illinois Council only, including receipt of the bulletin of the council and admission to all meetings of the council; (2) a fee of $1.25 for membership in the Illinois Council, with privileges previously stated, plus membership in the National Council which includes a year's subscription to the Journal of Geography; (3) a sustaining fee, $5 or more, which places the member on the Sustaining Membership list and stamps him as a special advocate of the geography movement.

The Illinois Council of Geography Teachers has met with cordial approval from many teachers, from those in rural schools to University professors. The work is hardly begun however, and all can help promote the cause of geography in the great commonwealth of Illinois.

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COUNCIL ACTIVITIES IN NEBRASKA

By N. A. Bengtson, Director

THE Nebraska Chapter of the National Council of Geography Teachers is carrying on work along three definite lines,—(1) Seeking to strengthen geography programs at state and district teachers' meetings; (2) Emphasizing the use of available geographic publications; (3) Through standing committees, studying seriously the problem of improving the geography courses in the curricula of elementary and secondary schools.

The council provides the organization essential to make our needs for geography talent at educational meetings felt. For some years geography has been neglected on the programs of important associations because no definite demand for representation was expressed. The officers of such associations are in nearly all cases anxious to furnish the programs desired by the teachers, but inasmuch as they are not mind readers, they must judge the desires by the preferences positively stated. In response to such expression Professor Whitbeck was secured for the State Teachers' Association meeting of 1916, and by using him at four section sessions about fifteen hundred teachers were reached. The Geography section, attended by over four hundred teachers especially interested in geography, was a memorable success. Next year through the influence of the Council the Executive Committee of the State Teachers' Association has invited Professor Brigham, so we are looking forward to another great meeting. At district association meetings this spring, Professor Miller of Mankato, Minnesota, was on the program at the Northeast Section at Wayne; Miss Rose Clark of the Peru Normal at the Southeast Section at Nebraska City, and Miss Nelson of the University Teachers College at the Central Association at Hastings and the Southwest Association at Holdrege. From all these meetings very gratifying reports have been received. The Council is now also planning a two days' s meeting this spring to be held at Lincoln, one day of which is to be given to a field excursion.

The Nebraska Council is not planning on issuing any regular publication. The members feel that the Journal of Geography admirably fills the need in that line. A mimeographed bulletin of local matter is prepared and sent to members three or four times a year. This deals with helps in teaching local geography, notices of recent publications of value, selected bibliographies, and news items. The bulletin thus serves the purpose of a home publication and knits the membership into a somewhat closer union than would otherwise be possible.

The third line of work entered upon is still in its early stages so only its ideals and potentialities can be discussed. That geography in the course of study needs strengthening both in quality and in quantity is generally admitted, but the solution of the problem is not easy. Suggestions are abundant but they lack organization, and are generally hazy and indefinite. The subject matter of the course as well as methods of presentation are both under the fire of critics. The Nebraska Council feels that here is the problem of first import in Geography today, and have begun an attempt at its solution. Committees which are earnestly trying to work out a course of study that will measure up to the present ideals of geography teaching have been appointed. In order to study each phase of the school work intensively three committees have been selected,—for the elementary school, the junior high school, and the high school respectively. These committees have fields which overlap somewhat, an advantage in that it compels correlation and thus insures careful attention to proper sequence of the various topics to be studied. The members are anxious to correespond with teachers of geography in other states and thus facilitate exchange of ideas in the problems under discussion. The following is the committee membership:

"Geography in the Elementary School"

Miss Rose B. Clark, Peru State Normal, Chairman.
Superintendent C. E. Collett, Gothenburg.
Miss Annie M. Cogil, Lincoln.
Miss Agnes Mortimer, Lincoln.
Miss Mildred Walker, Omaha.
Miss Dora Krebs, Peru State Normal.
Miss Olive Griffith, Blair.

"Geography in the Junior High School"

Miss Jeanette C. Nelson, Uni. of Nebr., Lincoln, Chairman.

Professor H. H. Hahn, Wayne State Normal.
Professor E. E. Lackey, Wayne State Normal.
Miss Melvina Waters, Norfolk.
Miss Sue Wilson, Lincoln.
Miss Edith Johnson, Lincoln.
Miss Elizabeth McBride, Lincoln.

"Geography in the High School"

Professor A. J. Mercer, Kearney State Normal, Chairman.
Miss May Bardwell, Lincoln.
Professor J. T. Link, Seward.
Professor Wm. G. Bishop, Neb. Wesleyan Univ., Univ. Place.
Miss Cordelia Condra, Kearney.
Professor Albert Snare, Bellevue College, Bellevue.

These committees are planning to prepare detailed outlines of subject matter to be covered in the various grades, and as full and explicit directions as possible with regard to methods of presentation. Lists of references will also be suggested with carefully prepared notes to aid the teachers in selecting the references best suited to their especial needs. When the committees have prepared their reports, the final work of editing will be done by a committee of two members of each of the original committees meeting with the State Director as chairman. The final report will then, it is hoped, be presented as a published bulletin. For the completion of this work at least two more years will be necessary, and hence members will welcome suggestions from others who may be interested in the same problem.

This summarizes the work accomplished and in prospect by the Nebraska Council. The great value lies in organization, thus giving the geography teachers an avenue of expression and also serving as the bond which makes possible a serious and sympathetic study of problems of geography teaching. Furthermore, it promotes the association of congenial souls,—a social phase of real value.

◆

WORK OF THE MINNESOTA GEOGRAPHERS

By C. J. Posey, President Minnesota Council

THOSE who have followed the inception and growth of the National Council of Geography Teachers will agree that the pioneer work of its present efficient secretary in the organizing of that body would of itself entitle Minnesota to high rank in annals of the Council. Minnesota was also among the first of the states to organize a state council along the lines suggested by the national body. The advisability of organizing a state society and of discontinuing the then plan of meeting as a division of the state educational association was first discussed at a geography meeting in the fall of 1914. The following autumn such an organization was effected. Some of the reasons for desiring to separate from the larger educational association were (1) the new plan would give the geographers control in shaping their programs; (2) it was believed that by so doing the interests of geography in Minnesota could be better served, and (3) there was the desire to fall in line with the plans proposed by the National Council.

For two seasons past the State Council has met in affiliation with the Minnesota Educational Association, and at each meeting an interesting and valuable program has been given. The attendance at the second meeting was considerably greater than at the first. A meeting is planned for next autumn at which the content of high school geography will be discussed and a class demonstration of the problem method of teaching geography will be given.

As a result of the interest aroused in geography by the State and National councils there has been formed a local society of geography teachers in each of the Twin Cities. The St. Paul society has been conducted under the leadership of Professor L. L. Everly, Assistant Superintendent of the St. Paul schools. The work it has done has always been very practical and of the sort that would show immediate results in the geography teaching in the school room. The Minneapolis society has done work along professional lines, also, but it has not gone into methods of teaching in detail. One interesting feature of the work this season is the study of the local geography through field trips. An important phase of its work is the large influence some of its members have had in the revision of the course in upper grade geography for the Minneapolis schools.

The large and increasing attendance at the State Council meetings points to the next desirable step, namely, that in each of the six sectional teachers' associations in Minnesota there should be organized either a division of geography within the association or else an independent society which should offer a geography program each year. Such a division was organized several years ago in the Northeastern Association by Professor Van Cleef of the Duluth Normal, and it has shown a healthy growth.

It is in these more local associations, such as those mentioned above and those of the Twin Cities, that the "new geography" can be got to the most people, and it would, therefore, be the part of wisdom for the National Council to give more attention to them than it has heretofore done. Under the present system some of the teachers, because of the added expense, join the local society and the National Council, and neglect the State Council. This tends to create competition between the latter and the local society. Surely some satisfactory plan can be evolved whereby membership in the local society will automatically carry membership in the state and national organizations.

In each of our five state normal schools excellent courses in geography are offered by well prepared teachers and the University offers twelve different courses in the subject. The work done at these institutions together with what is being done in the various geography associations indicates that the case of geography in Minnesota is not at all bad. The aim of Minnesota geographers is to make it much better.

CONSTITUTION OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

I. NAME

This organization shall be known as the National Council of Geography Teachers.

II. OBJECT

The object of the National Council of Geography Teachers shall be to increase the effectiveness of geography teaching in America (a) by promotion of national educational movements; (b) by cooperating in the organization and development of state associations; and (c) in such other ways as the officers may from time to time determine.

III. MEMBERSHIP

Any teacher of geography, or any person interested in the improvement of geography teaching, may become a member of the National Council on written application to the Secretary and the payment of the annual fee of one dollar. Members shall receive the Journal of Geography, and such occasional publications as may be issued by the National Council.

IV. OFFICERS

The officers of the National Council shall be a Bo
Directors, not to exceed fifty in number; an Executiv

mittee of nine; a President; two Vice Presidents; a Secretary; and a Treasurer.

V. Election of Officers

Board of Directors—State Directors.

Each affiliated state association shall elect annually one director in the National Council for each hundred members in the state association, provided, however, that each state association shall be entitled to at least one director. When the number of state directors shall exceed fifty, a new basis of representation shall be established by the Board of Directors. Any member of the National Council may be elected a director.

Directors at Large

The Board of Directors, as above constituted, may appoint a sufficient number of Directors at Large, to make their total membership fifty.

Executive Committee.

The Executive Committee shall consist of the President and Secretary, ex officio, and nine members of the National Council elected by the Board of Directors. The term of office of an elected member of the Executive Committee shall be three years, and three members shall be elected annually. Not more than three elected members shall be from one state.

Any member of the National Council who is a teacher or supervisor of geography shall be eligible to election as an officer or member of the Executive Committee. Eligibility shall continue with retirement from active teaching.

The President, Vice Presidents, Secretary, and Treasurer shall be elected annually by the Board of Directors. Vacancies in either of these offices may be filled by the Executive Committee.

VI. Duties of Officers

Board of Directors.

The Board of Directors shall have general oversight of the affairs of the National Council, and shall hold at least one meeting annually at such time and place as may be determined by the Executive Committee.

Each director is expected to further the development of the affiliated state association with which he is connected, and to represent the interests of such association in the Board of Directors.

Executive Committee.

The Executive Committee shall manage the affairs of the National Council between the annual meetings, and shall report to the Board of Directors annually, or when called upon to do so. All obligations for the detailed management of the affairs of the National Council, not specifically placed elsewhere by this constitution shall be vested in the Executive Committee.

Presidents and Vice Presidents.

The President shall preside at meetings of the National Council, of the Board of Directors and of the Executive Committee, and shall perform such other duties as are pertinent to the office.

In the absence of the President, the senior Vice President present (or in his absence an elected chairman) shall preside and perform the duties of President, pro tempore.

Secretary and Treasurer.

The Secretary and Treasurer shall perform the usual duties of such officers. The Secretary shall be executive officer of the Executive Committee, responsible for the detailed management of the affairs of the National Council, Board of Directors, and Executive Committee.

VII. Meetings

Meetings of the National Council, Board of Directors, and Executive Committee shall be called for such time and places as may be determined by the Executive Committee, or by the President and Secretary.

At any meeting of the Board of Directors, representation of five State Associations, directly or by authorized proxy, shall constitute a quorum, provided, that this number shall include the President or Secretary of the National Council or their authorized proxies.

VIII. Amendments

This constitution may be amended by a two-thirds vote of the members of the Board of Directors present at any regular meeting or by a two-thirds vote of all members when such vote is taken by mail. When amendments are to be voted upon at a regular meeting at least one month's notice shall be given to each member of the Board of the nature of the proposed amendment, such notice to be sent upon order of the Executive Committee.

United States Geological Survey.

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65 Hammond St.,
Cambridge, Mass.

NEWS NOTES

GEOGRAPHY AT THE NORTH NEBRASKA TEACHERS' ASSOCIATION

At the spring meeting of the North Nebraska Association, the following geographical papers were presented:

In the Science and Mathematics Section—

Address: "Industrial Geography in the Junior High School," Prof. George J. Miller, Sec. Nat'l. Council of Geography Teachers.

In the Geography and Agriculture Section—

Illustrated talk: "Thirty minutes in Brazil," Prof. C. E. Persinger, Univ. of Nebraska. "Standardization of Geography," George J. Miller. "Measuring Ability and Progress in Geography," Prof. H. H. Hahn, head of the Dept. of Education, Wayne Normal School.

GEOGRAPHY SECTION AT THE LOUISIANA STATE TEACHERS' ASSOCIATION PROGRAM

"Community Studies Essential to Further Work in Geography," C. J. Brown, State Inspector of Rural Schools.

"Practical Geography for the Public Schools," T. A. Felt, General Secretary of the Alexandria Chamber of Commerce.

"A Type Lesson in Geography for the Lower Grades," Miss Lucile Scott, Alexandria, La.

"Geography and Everyday Life," F. V. Emerson, Professor of Geology, Louisiana State University.

NORTH EAST MINNESOTA MEETING

At the spring meeting of the N. E. Minnesota Teachers' Association, the Geography section carried out the following program:

1. The Use of Supplementary Materials in the Teaching of Geography, Principal E. S. Clem, Bovey, Minn.
2. Geography in the Intermediate Grades, Mabel C. Lynch, Cloquet, Minn.
3. Geography from the Newspaper Man's View Point, Chas. S. Mitchell, Editorial Writer, *Duluth News Tribune.*

THE NORTH DAKOTA COUNCIL ISSUES A PRINTED BULLETIN

Following the example set by several of the other state leaders, Professor Howard Simpson has issued No. 1 of the Bulletin of the North Dakota Council of Geography Teachers. It is a closely printed 4-page folder, giving a brief history of the new movement in geography in the United States, plan of organization of the National Council, and its aims and purposes. It includes also an account of what is being done in North Dakota and what is planned for the future. Professor Simpson is to be congratulated on this undertaking. The Bulletin will materially aid in building up the work in North Dakota.

MILWAUKEE ORGANIZES A GEOGRAPHICAL SOCIETY

Under the leadership of Professor Lucius T. Gould of the Milwaukee State Normal School, a flourishing geographical society has been organized in that city. Monthly meetings are held. The plans for next year include monthly meetings with speakers from Chicago, Madison and other centers of geographical activity. An effort will be made to interest professional and business men as well as teachers.

MEETING IN KENTUCKY

The meeting of the Council of Geography Teachers of Kentucky met in connection with the State Teachers Association April 25th to 28th. It was a large attendance of enthusiastic teachers interested in the subject who listened attentively to the discussion by Miss Ellen Churchill Semple on "Reading the Map of Russia." There was a discussion on the Minimum Essentials in Geography, by Prof. C. D. Lewis of Berea College, after which there was a lively discussion of problems of Geography teaching. The teachers of the state are aroused and enthusiastic over the possibility of making Geography more vital and of more abiding interest to the children and teachers of Kentucky.

R. P. Green, of the Western Kentucky State Normal School and Miss Florence Kalert of the Louisville Normal School were elected President and Secretary respectively for the ensuing year and instructed to continue the line of activity heretofore utilized; a committee was appointed for the purpose of bringing Geography to the attention of every County Superintendent and congressional teachers' meeting for the ensuing year.

A VALUABLE PAPER AND MAP

In the Annals of the Association of American Geographers for 1916 (Vol. VI), Professor N. M. Fenneman presents a paper on "Physiographic Divisions of the United States." The paper includes 80 pages of text and a map 18 x 28 inches, in three colors. The map represents the labors of a highly competent sub-committee of the Association of American Geographers and of the U. S. Geological Survey, assisted by a larger committee of geologists and geographers. The map is the most carefully worked-out of its kind that has ever been prepared for the United States. Copies of the paper including map (26 cents), or of the map alone (10 cents) may be secured from R. E. Dodge, Editor, Washington, Conn.

SUMMER COURSES IN GEOGRAPHY

By F. E. WILLIAMS, University of Wisconsin

The following list is incomplete. An effort was made to secure information from all the larger universities and many of the smaller ones. Some did not respond to our inquiries and others did not send details regarding courses. Many normal schools give summer courses in geography.

UNIVERSITY OF CALIFORNIA, BERKELEY

The Teaching of Geography in Elementary Schools with Special Reference to Regional Geography, Miss Kirchwey.
The Teaching of Geography in Secondary Schools, Miss Kirchwey.

UNIVERSITY OF CHICAGO

Economic and Commercial Geography, Assistant Professor Jones.
Meteorology, Associate Professor Tower.
Distribution and Causes of Rainfall, Professor Jefferson.
Northern Europe, Professor Jefferson.
Conservation of Natural Resources, Professor Barrows.
Geography of South America, Associate Professor Tower.
Geography of Asia, Assistant Professor Jones.
Geographic Influences in the History of the Interior, Professor Barrows.
Field Geography, Southeastern Minnesota, June 18 for four weeks, Mr. Colby.
Field Geography, Mississippi River, July 27 for 4 weeks, Mr. Colby.
Field Geography, Lower St. Lawrence Valley and the Maritine Provinces, Associate Professor Tower.

The School of Education of Chicago University offers courses in:

Geography in the Primary Grades, Home and World Geography, Associate Professor Baber.
Geography in the Grammar Grades; North America, Associate Professor Baber.
Geography in the Grammar Grades; South America, Associate Professor Baber.
Geography in the High School, Associate Professor Baber.

CLEVELAND SCHOOL OF EDUCATION, CLEVELAND, OHIO

Physical Geography, Mr. Gregory—Miss Hungerford.
Industrial and Commercial Geography, Mr. Gregory—Miss Hungerford.
The Teaching of Geography, Mr. Gregory—Miss Hungerford.

University of Colorado, Boulder

Principles of Earth Science, Professor McCourt.
Geographic Influences, Professor McCourt.
Climatology, Mr. Hinds.
Industrial Geography, Professor McCourt.
Geographic and Geologic Excursion, Aug. 4-28, Professor McCourt.

Columbia University, New York, N. Y.

The Interpretation of Scenery, Professor D. W. Johnson.
Physical Geography and Its Economic Aspects, Professors D. W. Johnson and Lehnerts.
Physiography of the Western United States, Professor D. W. Johnson.
Field Work in Physiography, Professors D. W. Johnson and Lehnerts.
Commercial Geography, Professor McFarlane.
Geography of Industry and Trade, Professor McFarlane.
Geographic Delineation and Map Interpretation, Professor Lehnerts.
Geographic Influences in American History, Professor Brigham.
The Geography of New York State, Professor Brigham.
Mathematical Geography, Professor Jacoby.
Field Work in Glacier National Park, Professor Lehnerts.

The School of Education of Columbia University offers courses in:

The Teaching of Geography in the Lower Grades, Mr. Calkins.
The Teaching of Geography in the Upper Grades, Mr. Calkins.
General Geography for Elementary Schools, Mr. Calkins.
The Teaching of Regional Geography in the Junior High School, Mr. Calkins.

Cornell University, Ithaca, N. Y.

Physical Geography, Assistant Professor von Engeln.
Commercial and Industrial Geography, Assistant Professor von Engeln.
Geography and Geology, Field Course, A series of short excursions, Assistant Professor von Engeln.

Harvard University, Cambridge, Mass.

Physiographic Field Studies, Professor Wallace W. Atwood.

Indiana University, Bloomington

Physical Geography, Associate Professor Beede.
Economic Geography, Associate Professor Beede.

The School of Education of Indiana University, offer

The Teaching of Geography, Mr. Ramsey.

UNIVERSITY OF IOWA, IOWA CITY

Geology of Soils, Professor Trowbridge; Mr. Shipton.
Physical Geography, Professor Trowbridge; Mr. Shipton.
Physical Geography, Second Term, Dr. Leighton.

UNIVERSITY OF KANSAS, LAWRENCE

Physiography, Professor Haworth.
Summer Field Work, Assistant Professor Haynes.

LOUISIANA STATE UNIVERSITY, BATON ROUGE

Physiography, Professor Emerson.
Geology and Geography of Louisiana, Professor Emerson.

UNIVERSITY OF MICHIGAN, ANN ARBOR

Teachers' Course in Physiography, Assistant Professor Scott.
Elementary Meteorology, Assistant Professor Scott.

UNIVERSITY OF MINNESOTA, MINNEAPOLIS

Physiography, Assistant Professor Posey.
Geography of North America, Assistant Professor Posey.
Teachers' Course in Geography, Assistant Professor Posey.
Field Course in Geography, Mr. Lehnerts.

UNIVERSITY OF MISSOURI, COLUMBIA

Teachers' Geography, Mr. Bratton.
Fundamentals of Physical and Human Geography, Mr. Branom.
Advanced Commercial Geography, Mr. Bratton.
Geographic Influences in American History, Mr. Branom.
Geographic Field Trip, The Atlantic Coast, Mr. Branom.
Geography of North America, Mr. Branom.

UNIVERSITY OF NEBRASKA, LINCOLN

Physical Geography, Miss Nelson.
Regional Geography of North America, Associate Professor Bengtson.
Geography of European Countries, Associate Professor Bengtson.
Geography of Nebraska, Associate Professor Bengtson.

NEW YORK UNIVERSITY, NEW YORK CITY

Principles of Economic Geography, Mr. Nielson.
General Physiography and Geology (Field Course), Professor Woodman.
Special Topics in Geography, Professor Woodman.
Research in Geography and Geology, Professor Woodman.

UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL

Commercial and Industrial Geology, Professor Cobb.
The Teaching of High School Geography, Mr. Smith.

NORTHWESTERN UNIVERSITY, EVANSTON, ILL.

Geology and Physiography, Professor Grant.
Geology and Physiography of the United States, Professor Grant.
Field Course in Lake Superior Region, Professor Grant.

OBERLIN COLLEGE, OBERLIN, OHIO

Principles of Geography, Professor Hubbard.

OHIO UNIVERSITY, ATHENS

Physical Geography, Professor Thompson.
Political Geography, Professor Thompson.
Methods in Geography, Professor Martzolff.

GEORGE PEABODY COLLEGE FOR TEACHERS, NASHVILLE, TENN.

Fundamentals of Grade Geography, Mr. Parkins.
Elements and Principles of Geography, Mr. Sauer.
The Geography and Commerce of South America, Mr. Snider.
Commercial Geography, Mr. Sauer.
Geography of Europe, Mr. Parkins.
Geography of the South, Mr. Parkins.
Influence of Geography on American History, with Special Emphasis on the South, Mr. Sauer.
The Teaching of Geography, Mr. Parkins.
Geographic Problems, Mr. Parkins.

UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA

Commercial and Industrial Geography, Professor Gregory.
Physical Geography, Professor Gregory.
The Teaching of Geography, Professor Gregory.

SUMMER SCHOOL OF THE SOUTH, KNOXVILLE, TENN.

Home and World Geography, Miss Henderson.
North America, Miss Henderson.

UNIVERSITY OF WISCONSIN, MADISON

Commercial and Industrial Geography, Professor Whitbeck.
Geography of South America, Professor Whitbeck.
Physical and Applied Geography, Associate Professor Martin.
Geography of Wisconsin, Associate Professor Martin.
Glaciers and Glaciation, Associate Professor Martin.

LIST OF MEMBERS OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS IN MAY, 1917

ALASKA

Deierling, Fredricka...........Valdez

ALABAMA

Dodge, Oliver J...............Mobile
Sheffield, Mrs. F. L...........Mobile

ARIZONA

Phelps, Anna W.............Phoenix
Wilson, Jas. R...............Phoenix

ARKANSAS

Webb, V. L...............Little Rock

CALIFORNIA

Baugh, Ruth E...........Los Angeles
Barton, Carrie N.........Long Beach
Buwalda, Dr. J. P...........Berkeley
Carter, Miss L. E...........Santa Ana
Cameron, Mrs. Mary.........Berkeley
Carey, Mr. E. P.............Berkeley
Cochrane, Mrs. L. G.......San Rafael
Chamberlain, James F....Los Angeles
Clark, Miss Vinnie........San Diego
Clark, Mrs. Addie M.........Oakland
Cowan, M. A...........San Francisco
Cooper, William J...........Berkeley
Dickerson, Dr. Roy E...San Francisco
Fairbanks, Dr. H. W.........Berkeley
Franklin, F. M..........San Francisco
Glover, C. A............Pacific Grove
Gray, Miss Vesta.........Santa Rosa
Holway, R. S................Berkeley
Hood, Blanche...........Los Angeles
Huff, Wm. F..............Long Beach
Hoffman, Ruth C............Riverside
Hewett, Lucile..............Alameda
Hinze, Clara...............Los Gatos
Jamison, Carrie L...........Alameda
Kellogg, T. E...........San Francisco
Leick, Lucie M.............San Pedro
Linsley, Earle G.....Mills College P.O.
Liscott, J. W..............Santa Cruz
Metcalf, Miss Belda.........Glendale
McClellan, Myrta Lisle...Los Angeles
Maguire, Miss Mary.........Oakland
Ogden, Etta L...............Oakland
Preston, James T............Berkeley
Schoenweter, Theo. H...Santa Monica
Sellender, Miss A............Oakland
Shau, Mrs. L. A........San Francisco
Snow, Irving W.............Campbell
Snyder, Dr. W. H.........Los Angeles
Van Cleve, R. G...........Los Angeles
Vandergaw, Ida..............Oakland
Vander Eike, Paul........Bakersfield
Ward, Helen...........San Francisco
Webster, Mrs. A. H.........Oakland
Wheelock, A. N.............Diverside
Wilcox, Glenn A.............Martinez

COLORADO

Cannon, George L............Denver
Gilbert, Arthur.............Telluride
Harrington, Mary.............Denver
Hendricks, Josie............Crawford
Kelsey, Verna B.............La Junta
McCrary, Blanche...........Telluride
Merrill, Miss L. A.............Denver
Page, Mrs. Jessie D...........Greeley
Roe, Mrs. G. A...............Sterling
Sandine Agnes...........Fort Collins
Wheeler, Winnie E..........Montrose

CONNECTICUT

Brooks, Dr. C. F..........New Haven
Dodge, R. E..............Washington
Eames, Emma F...........Bridgeport
Erwin, Donna...............Winsted
Gibbs, Dr. David............Meriden
Hallock, Ada..............Bridgeport
Havemeyer, Loomis.......New Haven
Keeney, Sylvia..........New London
Lockhart, Charles E........Plantsville
McCarthy, J. C............New Haven
Poland, Emma..........New Britain
Pratt, Chas. E............New Britain
Waldorf, Florence N.........Hartford
Wanamaker, W. Lewis.......Suffield
White, Miss C. E.........New Haven

DISTRICT OF COLUMBIA

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Carpenter, Frank G.......Washington
Dowd, Michael...........Washington
Hay, Frances S...........Washington
Hendley, Flora L.........Washington
Meriwether, Colyer.....Takoma Park
Shackleford, Miss Laura..Washington

FLORIDA

Rutherford, R. B.........Jacksonville

GEORGIA

Smith, Anastasia D.........Columbus

IDAHO

Reed, Joseph...............Lewiston
Truman, Charlotte E...........Albion

ILLINOIS

Andrews, Prin. W. E............Pana
Arvidson, Esther...........Rockford
Bobbitt, J. F.................Chicago
Brown, Agnes..............Rockford
Barrett, Nellie............Collinsville
Bennett, Mary A............Carthage
Bass, Ozela Z..................Quincy
Bassett, Herbert..............Macomb
Barker, Garl H...............Decatur
Bell, Virginia C..............Chicago
Bengston, Miss Caroline......Chicago
Blackburn, Eunice R.........Chicago
Briscoe, H. G.................Detroit
Brokaw, Mrs. Clara S.........Chicago
Brown, Hallie.................Peoria
Burritt, Neenah.............Rockford
Butler, E. D.................Sullivan
Chapin, Lillian..............Chicago
Clark, Nora A...............Chicago
Campbell, Arabel..........St. Charles

Campbell, Edna	Chicago
Collins, Nellie C.	Abingon
Clem, Harry M.	Evanston
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Collins, Eloise G.	Decatur
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Crompton, Mabelle	Rock Island
Crosby, Rena L.	Evanston
Davidson, Mary A.	Libertyville
Danner, Miss Leota	Astoria
Doran, Nora F.	Homewood
David, Miss Hannah	Normal
Denoyer, L. P.	Chicago
Diefenthaler, S. M.	Freeport
Dillon, Jessie M.	Normal
Dopp, Mary	Chicago
Draper, Anna	Springfield
Dobson, Lulu	Cerro Gordo
Drew, Miss Alberta L.	Joliet
Eifrig, C. W. G.	Oak Park
Ellis, Grace	Rockford
Endemon, Maude	Chatham
Entrikin, Virginia L.	Murrayville
Fassett, Eunice	Chicago
Gannage, Alta	Macomb
Garrity, Byrnina	Wheaton
Gahlman, V. M.	Springfield
Gilpatrick, Mabel E.	Chicago
Glasgow, Edna	Hanna City
Goode, J. Paul	Chicago
Grant, Prof. U. S.	Evanston
Gill, Chas. M.	Quincy
Grenlund, Miss Emily	Rockford
Gunn, Margaret	Harvey
Harrison, Lucia C.	Chicago
Hanon, Raymond	Morrisonville
Hanon, John	Tovey
Haas, W. H.	Evanston
Harnish, W. E.	Marshall
Haviland, Altha	Savanna
Harding, Edith J.	Chicago
Hitchcock, Elizabeth	Normal
Holliday, Helen	Macomb
Hunt, Elma Miss	Urbana
Hutchison, Jessie	Hoppeston
Inman, Leona	Gibson City
Jones, Wellington D.	Chicago
Johnson, Maude E.	Rockford
Kenward, Nancy	Roberts
Keeler, Harry	Chicago
Kiem, Edna	Quincy
Kennedy, Lois	Berwyn
Kilcullen, Mae T.	Chicago Heights
Kinsey, N. Nora	Normal
King, Miss Eleanor	Quincy
Kumlin, Ruth	Rockford
Lawrence, Winnifred	Barrington
Lanier, Mary J.	Chicago
Large, J. N.	Joliet
Lean, Cora L.	Geneva
Lake, Edna G.	Cicero
Lathrop, Wm.	Urbana
Lewis, Queene	Ladd
Lincoln, Grace B.	Chicago
Livingstone, Cora	Bloomington
Lobaugh, E. D.	Chicago
Lukens, Herman T.	Chicago
Mann, Rubie	Rockford
McClure, S. M.	Elgin
McGinnis, Cecilia	Kankakee
McCormick, Julia	Chicago
McGough, Catherine L.	Lincoln
McLean, Catherine C.	Chicago
Ottosen, Elsie	Chicago
Patterson, Jessie M.	Bloomington
Phelps, Katherine	Rockford
Porch, Edna	Oakland
Rabb, Miss Mary E.	Bloomington
Rich, Prof. John L.	Urbana
Ridgley, D. C.	Normal
Russell, H. Harrison	Normal
Rusch, O. F.	River Forest
Salisbury, Prof. R. D.	Chicago
Stevens, Fannie L.	Macomb
Smith, James H.	Chicago
Spicer, C. E.	Joliet
Smith, Annie L.	Joliet
Southworth, Eva	De Kalb
Stark, Mabel C.	Normal
Stevens, Nellie	Granite City
Stewart, Edith	Rockford
Strong, Helen M.	Chicago
Sykes, Marian	Chicago
Taylor, Thomas R.	Evanston
Thomson, George T.	Riverside
Tower, Walter S.	Chicago
Tracy, Anne C.	Peoria
Theis, Vera G.	Brinfield
Voight, Miss Lena	Peoria
Wilson, Ruth W.	Springfield
Waldo, Miss Jennie E.	East Rockford
Whittenberg, Clarice	Springfield
Winslow, Chas. S.	Evanston
Young, May E.	E. St. Louis

INDIANA

Agar, E. W.	Valparaiso
Andrus, Ida M.	Indianapolis
Burmaster, Rosa M.	Muncie
Berchhausen, Anna	Indianapolis
De Vilbiss, Bess	Fort Wayne
Dryer, Chas. R.	Fort Wayne
Erf, Norma	Fort Wayne
Fiedler, Adelaide L.	Fort Wayne
Griffith, M. S.	Indianapolis
Hamilton, G. R.	Columbia City
Morford, Ella	Evansville
Ramsey, E. E.	Bloomington
Reeves, Lillian	Indianapolis
Reade, Anna R.	Indianapolis
Thompson, Clem O.	Salem
Thomas, J. B.	Danville
Wenner, Dorothy	Indianapolis
Young, Elizabeth A.	Winona Lake

IOWA

Banghart, C. F.	Burlington
Cable, E. J.	Iowa City
Christens, Inger	Aurubon
Harper, Clara A.	Des Moines
Hancock, Minnie	Maquoketa
Hearty, Susan	Des Moines
Kant, Nellie G.	Burlington
Lippert, Stella	Burlington
Munley, Mary	Council Bluffs

Peters, Mary A	West Side
Prall, Ethel	Meservey
Russell, Nancy	Corning
Schroeder, Julia	Nodaway
Schoewe, Walter H	Iowa City
Wallace, Ruth	Council Bluffs

KANSAS

Atwood, Jane K	Emporia
Allen, Mame	Kansas City
Board of Education	Topeka
Buckland, Clara E	Hutchinson
Blecha, Miss Josephine	Severy
Bixby, Miss Bessie	Lawrence
Campbell, Jennie I	Clyde
Chandler, H. E	Junction City
Dahlgren, Mabel	Kansas City
Hildebrand, Elizabeth	Hutchinson
Howe, M. M	Kansas City
Henkins, Ethel	Burlington
Jones, Miss Catherine H	Emporia
Kaho, J. F	Topeka
Knox, Florence	Kansas City
Lowther, Supt. L. A	Emporia
Mattingly, Mary	Wichita
Morton, Madge	Little River
Maupin, Mrs. Rella	Stafford
Prout, Miss Margaret	Topeka
Pryor, Pearl	Wichita
Ripperton, Clara	Wichita
Roseberry, Miss E. E	Pittsburg
Small, Mabel	Wichita
Shephard, Ina M	Kansas City
Smith, Mr. Hart	Rosalia
Thompson, Mrs. E. C	Topeka
West, Elizabeth	Beloit
Weeks, Emma	Garden City
Williams, Jennie	Emporia
Wolf, Eva H	Kansas City
Yeoman, Mrs. J. Rose	Hutchinson

KENTUCKY

Austin, Roberta	Waverly
Burks, Eva M	Louisville
Croft, Mrs. Stella B	Louisville
Deane, Mrs. M. B	Richmond
Green, Prof. R. P	Bowling Green
Hawkins, Mrs. Iolene	Flemingsburg
Henry, Ruby A	Louisville
Hubbs, Stella	Elizabethtown
Jones, Vitula	Owensboro
Lumpkin, Anna Lee	Owensboro
Latimer, Ella V	Louisville
Powers, J. P	Covington
Skene, Belle	Louisville
Zachari, Elizabeth	Louisville

LOUISIANA

Avery, W. J	Bastrop
Emerson, F. V	Baton Rouge
Feger, Hattie V	New Orleans
Reagan, C R	Alexandria
Sophie Wright High School	New Orleans

MAINE

Emmons, Wm. H	Deering
Long, Harriet B	Westbrook
O'Neil, Joseph C	Portland
Porter, Virginia A	Farmington
Philbrook, E. E	Castine
Tobey, Ray W	Hinckley
Tubbs, Frank D	Lewiston

MARYLAND

Alford, Delia R	Arlington
Bamberger, Stella H	Baltimore
Smith, Wilsie M	Denton
Stover, Marion P	Forest Glen
Thompson, David	Baltimore
Worthington, Miss A. M	Baltimore

MASSACHUSETTS

Allen, Clarence E	Newton
Atherton, L. B	Medford
Allen, Nellie B	Fitchburg
Atwood, Wallace W	Cambridge
Bascom, Ethel M	Woburn
Boyle, Ella J	Cambridge
Blossom, Ida L	Cliftondale
Brady, Elizabeth R	Dorchester
Buckley, Emma	Worcester
Buswell, Marion E	Dorchester
Burke, Gertrude M	West Quincy
Black, Selina A	West Somerville
Bragdon, Mary D	Quincy
Bowen, Mrs. Alice D	Melrose Hghlds.
Barton, Prof. G. S	Boston
Chase, Miss Lenox	Amesbury
Craig, Mrs. C. A	Townsend
Cushing, Sumner W	Salem
Cutter, Mary A	Roxbury
Collins, C. B	Rockland
Carrigan, Rose A	Boston
Clark, Miss Linna	Mattapan
Clark, Frances	Lowell
Davis, W. M	Cambridge
Davis, Fannie A	Stoneham
Dowe, Harriet H	Melrose
Day, May E	Westford
Emerson, Philip	Lynn
Elder, Miss G. A	West Newton
Eaton, Emma L	So. Boston
Foley, Nellie M	Boston
Fisher, Elizabeth	Wellesley
Flagg, Abby E	Brookline
Ferguson, Lucia A	Boston
Flanders, Verna B	Salem
Forsaith, Frances	Dorchester
Frazier, Clara J	Lynn
Gallagher, Beatrice F	Newton
Goodspeed, Celia W	Newton
Goodrich, Annie L	Malden
Gould, Arthur L	Rockland
Gould, Ella F	Brockton
Howes, L. Gertrude	Roxbury
Hamlin, Lucy	Roxbury
Hobart, F. E	Malden
Hubbard, J. W	Worcester
Hall, Charlotte	West Roxbury
Hansen, Alyda	Wellesley
Huntington, Ellsworth	Milton
Hobbs, Ethel E	Lynnfield Center
Jones, Clarence H	West Roxbury
Kelly, Marion	Everett
Kennedy, N. Elizabeth	Somerville

Kelley, Ellen E..................Canton
King, Charles F..............Roxbury
Leahy, Anna E.............So. Boston
Leatherbee, Florence K......Cambridge
Lincoln, Arthur A..........Dorchester
Lytle, Carl D...................Melrose
Lyman, Cassius S..............Hudson
Lyons, Sarah A................Boston
Murphy, George E..........Dorchester
Manning, Etta A...........Dorchester
Murch, M. S..................Roxbury
Mott, A. M................Swampscott
Manell, Harriet S...........Fall River
McMahon, Ellen A..........Dorchester
Mayo, Gertrude E.........East Boston
Moore, Edward..........West Newton
Mahaney, E. Beatrice.......Dorchester
Norcross, Harriet H........Watertown
Nutter, A. P.............West Roxbury
Nutter, Miss C. E..............Boston
O'Bryan, Evelyn...............Boston
Owen, Frederic L..........Dorchester
Patton, Leonard M.............Milton
Pendleton, Mrs. C. B...........Boston
Pratt, Miss E. L..............Roxbury
Pease, Elizabeth D. K........Brookline
Pollard, T. B...................Quincy
Putnam, Clara A..............Andover
Peyton, Alice C..............Stoneham
Packard, Leonard..............Boston
Ramsdell, Louie G........Framingham
Ryder, Harriet W...Newton Highlands
Robinson, Mrs. Alice M.....So. Boston
Ray, Charlotte G.............Brookline
Radlo, Dora A..............No. Adams
Spooner, Mrs. Harriet B...Auburndale
Sinnott, Chas. P...........Bridgewater
Sr. M. St. Teresa..............Canton
Suckling, John F...........Dorchester
Sleeper, Harriett A..........Haverhill
Shirley, Margaret I............Quincy
Shipman, Julia M............Mattapan
Sears, Seth.....................Boston
Sharp, Clara A.............So. Boston
Stevens, Carrie H..........Cambridge
Sheafe, Lewis A............Amesbury
Shatswell, Miss M. E............Salem
Taylor, Ruth A..............Wollaston
Thrasher, Ida M...Newton Highlands
Thompson, Mary Helen.........Boston
Tupper, Louise E............Westport
Tirrell, Winthrop..............Boston
Vantura, John J..............Belmont
Ward, Robert DeC..........Cambridge
Wollahm, Helen H............Danvers
Whitaker, Caroline A..........Chelsea
Woodward, Annie C........Somerville
Whitcher, J. W.................Quincy
Woolmer, Gertrude A..........Everett
Woodward, Blanche D..........Boston

MICHIGAN

Bloomer, Stella...................Ionia
Bollinger, C. J..............Chesaning
Clark, Genevieve.............Ypsilanti
Clark, Emmanuel M.......Big Rapids
Calkins, R. D.............Mt. Pleasant
Daly, Charles A................Detroit
Dean, Angeline M...........Coldwater
Eirich, Constance G.......Battle Creek
Hoover, J. W..................Calumet
Jefferson, Mark ....Ypsilanti
Lamb, Lottie L................Milford
McLellan, Mary............Manistique
Metz, Prof. C. T............St. Joseph
Reid, Edgar S.............Chesaning
Steimle, John M..........Atlanta Mine
Stern, Sophia................Escanaba
Smith, Lena ....Lakeview
Skinner, Clara E.......Grand Rapids
Strahan, Margaret.......Grand Rapids
Wood, L. H.................Kalamazoo
Williamson, Zella M...........Vassar
Watson, Ruth R..........Mt. Pleasant
Wilcox, Chas. C............Kalamazoo
Westphal, Louise ....Bay City
Williams, Sadie M................Flint

MINNESOTA

Adams, Emma N..........Minneapolis
Anderson, Margaret......Minneapolis
Ballentine, Emma.........Minneapolis
Bangart, Rev. Daniel.....Collegeville
Babcock, M. Vinette......Minneapolis
Brammer, Miss Sara..........Winona
Boyd, Helen W...........Minneapolis
Brammer, Jessie..............Winona
Carry, A. E. V............Minneapolis
Christie, Miss Blanche....Minneapolis
Copeland, Sarah L..........Montclair
Connelly, Mary M.............St. Paul
Councilman, Alice.......Minneapolis
Clem, E. S......................Bovey
Coffin, Ira................Minneapolis
Crowley, C. R............Minneapolis
Draper, Anna M. G.......Minneapolis
Drum, Jean.................Stillwater
Erickson, Emma S............Chicago
Erb, Nellie M............Minneapolis
Finn, Miss D. A.........Minneapolis
Folsom, Louise M........Minneapolis
Frederickson, M..........Minneapolis
Gish, Bessie K...........Minneapolis
Gilkey, Katherine........Minneapolis
Gorgen, Mary............Minneapolis
Hatz, Anna B.........So. Minneapolis
Hankee, Gertrude............St. Paul
Hanson, Miss............Minneapolis
Haynes, Florence............Mankato
Huff, C. E...............Minneapolis
Hughes, Harriet J........Minneapolis
Jensen, Bertha...........Minneapolis
Joseph, W. J..................St. Paul
Keith, Olive ....Iron Mountain
Knight, Bessie P.........Minneapolis
Layher, R. G.............Minneapolis
Lunn, L. E..............Heron Lake
Liedl, Miss Rose.........Minneapolis
Messenger, Mrs. H. R.....Minneapolis
Meyer, Hattie E............St. Peters
McCann, Alice L.........Minneap
McGregor, Tulie..........Minneap

Morrisey, W. E...........So. St. Paul
Manley, M. E.............Minneapolis
Meeker, Mary K..........Minneapolis
McGuane, Anna C........Minneapolis
Miller, Geo. J................Mankato
Nelson, Miss Aurora......St. Francis
Ohr, Francis.................St. Paul
Olson, Carrie............Minneapolis
Perkins, F. E...........Beaver Creek
Posey, C. J.............Minneapolis
Pettis, Josephine ....Concord
Quaile, Margaret.........Minneapolis
Rafdal, Hilda.............Albert Lea
Robinson, Virginia..........Marshall
Russell, C. R............Minneapolis
Scrap, Mary L.............Litchfield
Stiles, Clara L.............St. Cloud
Shove, Helen B...........Minneapolis
Small, Mary T...........Minneapolis
Sanders, Jennie M..........Moorhead
Seeley, Mrs. Jennie L.....Minneapolis
Scarborough, R. J.............Winona
Slifer, A. C..............Minneapolis
Tautges, Catherine.......Minneapolis
Thrailkill, Fannie........Minneapolis
Treadgold, Miss N. M.....Minneapolis
Thornton, Katherine.....Minneapolis
Underwood, Elizabeth....Minneapolis
Visher, S. S................Moorhead
Wilkinson, Sarah H......Minneapolis

MISSISSIPPI

Liddell, Clara.................Tupelo

MISSOURI

Burrows, Mark............Kirksville
Corlett, Eva...................Joplin
Cox, Philip W. L...........St. Louis
Cauffield, A. J.............Maryville
Cowan, J. R.............Kansas City
Davison, Leota ....Joplin
Fewel, M. Etta...............Clinton
Griffith, Floy W..............Liberty
Glatfelta, Alice.............St. Louis
Holdinghaus, Ethel......Granite City
Humphrey, E. O..............Joplin
Johnson, Elmer H.......Springfield
Miller, N. B. Jr...........Kansas City
Marston, C. E............Springfield
Ollson, Artena M.........Kansas City
Philipps, H. A...........Warrensburg
Prator, Moina............Springfield
Reavis, W. C................St. Louis
Shackleford, B. G............St. Louis
Shutts, Prof. Daniel..........Sedalia
Stevens, W. J...............St. Louis
Waggoner, O. W.............Harwood
Williams, Bertha P.........St. Louis
Wolf, Inez M............Kansas City

MONTANA

Dixon, Frances.................Butte
Finch, Grant E................Dillon
Freeman, O. W...........Lewistown
Holmes, E. E.............Deer Lodge
Kauffman, H. N.............Kalispell
Liddy, Mayme............Martinsdale
Paulson, Mary...............Stockett
Smith, Frances............Culbertson

NEBRASKA

Adee, J. H...............Steele City
Anderson, Esther S...........Lincoln
Bardwell, May...............Lincoln
Beynon, Lizzie H..............Archer
Becker, A. F...............Louisville
Boehr, John W..............Hastings
Brooker, Florence.........So. Omaha
Bayless, Lucy M..............Lincoln
Bengston, Prof. N. A..........Lincoln
Bishops, W. G........University Place
Clark, Rose B....................Peru
Condra, G. E.................Lincoln
Costolloe, Nora.............Fairbury
Cogil, Annie M. T............Lincoln
Ellsworth, Mrs. Cora M........Omaha
Forsyth, Fannie..............Omaha
Griffith, Olive..................Blair
Gross, Frances................Omaha
Graham, Mabel A..............Omaha
Howe, Catherine M............Omaha
Harrison, Agnes M............Omaha
Hendry, M. E.................Omaha
Hinterlong, Anna L...........Omaha
Jacobsen, Christina.........Tekamah
Johnson, Edith...............Lincoln
Jordan, Laura................Omaha
Knight, Ella B................Omaha
Kubs, Doig......................Peru
Loper, Edith C..................York
Larson, Esther H..............Omaha
Lynch, Nellie E...............Lincoln
Lehr, C. F.................Plainview
Lackey, Prof. E. E............Wayne
Link, J. T....................Seward
McGee, R. R...............David City
McLain, Grace N..............Omaha
McBride, Elizabeth..University Place
Mercer, Prof. A. J...........Kearney
McCarthy, Blanche M..........Omaha
Niedermeyer, Sara............Omaha
Newell, Mrs. Ethel...........Lincoln
Nelson, Jeanette C............Lincoln
Rooney, Elizabeth.............Omaha
Snare, Prof. Albert..........Bellevue
Shorrock, Grace..............Omaha
Thorngate, Ella...............Omaha
Taft, H. E....................Aurora
Waters, N. Melvina...........Norfolk
Woodard, J. A................Seward
Wiese, Bertha M..............Omaha
Wickstrom, Lydie E...........Omaha
Walker, Mildred S.............Omaha
Wilson, Sue..................Lincoln
Young, Etta M................Omaha

NEW HAMPSHIRE

Dowell, Norah E............Plymouth
Haseltine, Ruth..............Concord
Woodman, Lena..........Manchester

NEW JERSEY

Abbott, Alice...............Elizabeth
Ahrens, Minnie C.........Weehawken
Caldwell, S. E................Newark

Clark, Minnie L......Upper Montclair
Dalrymple, G. H...............Newark
Davidson, Mary E. L.....Weehawken
Fenimore, Mary:............Camden
Gorlick, Edith S.............Paterson
Huntting, Ella ....Montclair
Koyt, Miss V. A..............Newark
Lyon, Bertha P...........Jersey City
Libby, Prof. William........Princeton
Newman, M. Lilian...........Trenton
Pierrepont, Mollie C...........Trenton
Parker, C. W...................Trenton
Risden, Miss Marion.........Mt. Holly
Roberts, Gertrude S.......Asbury Park
Swem, Helen M..............Trenton
Smith, Ethel L................Trenton
Seabrook, Eva T...............Passaic
Sloan, Andrew L...............Passaic
Sister Helen Reta............Hoboken
Whitaker, Verna.............Millville
White, Miss C. E.............Trenton

NEW MEXICO

Kirk, Charles T..........Albuquerque

NEW YORK

Abbey, Roy E............Schenectady
Adams, Cyrus C.............Jewett
Bryant, Frank F............Brooklyn
Benson, Carrie................Buffalo
Butler, Ida M..................Buffalo
Burfer, Grace E.............Syracuse
Bonnar, Margaret E...........Buffalo
Bowman, Isaiah ....New York
Brigham, Albert P..........Hamilton
Banks, Chas. W. P..........New York
Beaman, Lucy.................Buffalo
Burns, Letta B..............Brooklyn
Barrett, May L.............Rochester
Butler, Harriet L.............Buffalo
Cullin, Mary A.................Buffalo
Coon, M. E...................Rochester
Down, Harriet A..............Buffalo
Darrin, Mrs. D.............New York
Dailey, Clara M.............Fredonia
Dillingham, J. D............Elmhurst
Eldridge, Jettie A.............Belfast
Eddy, Geo. E................Rochester
Forsythe, Marion.............Potsdam
Greig, Anna M.................Buffalo
Giles, Julia E..................Buffalo
Gerrity, Agnes A............Lockport
Gary, Minnie E................Buffalo
Gath, Emma L.................Buffalo
Groghegan, Esther..........Lockport
Hiller, Nettie................Falconer
Hopkins, T. C................Syracuse
Johnson, Douglas W........New York
Kip, A. Ralph...............Brooklyn
Kilts, Ethel L................Fredonia
Krull, Sherman W.............Buffalo
Latta, Ida H...................Albany
Lee, Isabel.....................Buffalo
Linsley, Miss Julia.........New Paltz
Luddington, Harriet A.......Brooklyn
Morrill, Jennie B..........Williamston
Martin, Mercedes E.....Niagara Falls
Myers, Miss A. B..............Oswego
McGowan, Mary C.............Buffalo
Merville, Guy C...................Bliss
Ryther, C. G...............Lackawana
Regan, Mary A..............New York
Record, Mrs. Carrie L........Fredonia
Robinson, L. A...............Brooklyn
Scott, Anne E.................Oneonta
Stewart, Lillian V...........Fredonia
Slack, Earl B...............New York
Small, Elizabeth B............Buffalo
Stout, Mabel ....Brooklyn
Streater, Katherine J..........Buffalo
Sullivan, Mary G..............Buffalo
Slater, H. B...........Elmhurst, L. I.
Smith, Mrs. Claudie E.........Buffalo
Tenney, L. Anabel........Mt. Vernon
Triess, Bertha..............Freeport
Thornton, Maude A.............Olean
Toomey, Margaret L.........Dunkirk
Werner, Cora J................Buffalo
Warren, M. Frances........New York

NORTH CAROLINA

Cobb, Prof. Collier........Chapel Hill
Ennes, Gertrude............Asheville
Hottel, Julia M..............Beaufort
Morrill, Jennie B.........Williamston

NORTH DAKOTA

Aasved, Nina H................Carson
Eilert, Supt. Sol. R..........Napoleon
Gustafson, Theo. A.............Minto
Pederson, Anna S.......Grand Forks
Simpson, Howard E........University
Switzer, J. E..............Valley City
Van Middlesworth, Edith..Valley City
Winsted, Huldah L.............Minot

OHIO

Anderson, Rachel M........West View
Aenis, Miss Clara..........Cleveland
Antrim, Louise..............Cleveland
Austin, Anna................Cleveland
Brady, Katherine..........Miamisburg
Braun, Geo. F..............Cincinnati
Backus, Grace W.............Warren
Bowee, Mary................Cleveland
Brown, Harriet..............Cleveland
Burlin, Catherine..........Cleveland
Beman, Lois.................Cleveland
Bailey, Lois..................Cleveland
Bernhart, Frieda..........Cincinnati
Beswick, Miss Grace........Cleveland
Brock, Margaret............Cleveland
Carney, Frank...............Granville
Chapman, Bertha...........Cleveland
Chapman, Prof. C. K...........Toledo
Corris, Esther F............Cleveland
Cunningham, Miss G........Cleveland
Deublin, Lydia.............Cleveland
Davis, Miss Mary..........Cleveland
Dutton, Chas. F. Jr.........Cleveland
Erwin, Jessie L..........Steubenville
Fenneman, Prof. N. M......Cincinnati
Fehn, Miss Nettie..............Toledo
Finnegan, Miss K. E........Cleveland
Glenn, Fannie S............Columbus
Gregory, Wm..........Euclid Heights
Hills, Thomas M...........Columbus

Harrison, Miss Celeste......Fremont
Howell, Lillian............Cleveland
Holt, Wm. P...........Bowling Green
Hoyt, Mrs. Alta............Cleveland
Hubbard, Prof. G. D.........Oberlin
Hickox, Minnie.............Cleveland
Hogan, Miss M. A...........Cleveland
Jack, Miss Mildred.........Cleveland
Jerger, Eunice.............Cleveland
Joy, Augusta...............Cleveland
Kinkead, Prof. R. G........Columbus
Leach, Josephine F..........Toledo
Loudenbach, Harvey M.......St. Paris
Logan, Cora Lee...........Cincinnati
Luck, Miss Emily..........Lakewood
Marine, Lucile..................Tiffin
McCarthy, Mrs. Nellie......Cleveland
McRobert, Carrie...........Cleveland
Marker, Miss Nettie...........Toledo
Metzger, Albert E. D........Columbus
McDonald, J. J.............Columbus
McMyler, Lillian........E. Cleveland
Meyer, Evelyn L.....Mt. Washington
Mehling, Miss Marie........Cleveland
Mitchell, Mrs. Ella..........Cleveland
Nicksch, Prof. R. A..........Rudolph
Nourse, Lora...............Cleveland
Nierman, Miss Syrian......Cincinnati
Northrup, Elizabeth .....Youngstown
Olson, David...................Kent
Pancoast, Eva..............Cleveland
Peck, Miss Verdine.........Cleveland
Phillips, Miss Mary.........Cleveland
Pittis, Margaret.........E. Cleveland
Quayle, Christine........E. Cleveland
Radcliffe, Ettie.............Cleveland
Roberts, Mary W...........Columbus
Ross, Florence.............Cleveland
Roberts, G. S............West Liberty
Reed, Harry E.................Akron
Sharp, Ryda ....Steubenville
Shepherd, Lulu............Cleveland
Strittmatter, Elsa..........Cleveland
Strate, Miss Jessie B.......Cincinnati
Shatzer, Prof. C. G........Springfield
Siringer, Miss Elma........Lakewood
Smith, Miss...............Cincinnati
Speckman, W. N................Berea
Szezytkowski, Lillian.......Cleveland
Turner, Mary..............Cleveland
Thompson, Bert. M..........Athens
Teal, Miss Susan...........Cleveland
Van Dyke, Stella..............Athens
Vaughan, Wilhelmina......Cleveland
Vickers, Prof. R. P..........Granville
Warth, Caroline............Cleveland
Wessa, Alice...............Cleveland
Weber, Miss Esther........Middleton
Wallis, Mary.............Youngstown
Waldeck, Emma............Cleveland
Wulf, Metha...............Cleveland
Wommelsdorf, Miss C......Lakewood
Zopf, Katherine............Cincinnati

OKLAHOMA

Eckles, Mae...........Oklahoma City
Johnson, Myrtle ....Muskogee
Taylor, Chas. H.................Enid

OREGON

Carlton, C. E................Portland
Maxwell, O. C...................Elgin
Pritchett, Fannie C...........Eugene
Richardson, Mrs. L........Springfield
Smith, Ida M.................Eugene

PENNSYLVANIA

Albert, Chas. H...........Bloomsburg
Anthony, Alice..........Philadelphia
Balliet, Blance P.........Lock Haven
Bennett, Mrs. V. B.........Pittsburgh
Canon, Calvin Grant..........Sharon
Carter, Harriet............Pittsburgh
Clark, Anna W..............Scranton
Clifford, W. N...........Philadelphia
Frank Inez...............Union City
Fancher, John E...........Pittsburgh
Groff, Gertrude A.............Wayne
Granger, C. E............Philadelphia
Gibson, Mary E..........Philadelphia
Grassmuck, Erna........Philadelphia
Gendell, Lucy C.........Philadelphia
Gilchrist, Ella J..........Philadelphia
Gourley, Florence M.............Erie
Gable, Emma E............Pittsburgh
Hamilton, Wm...........Philadelphia
Heilhecker, Jennie......Williamsport
Horn, Bertha............Philadelphia
Harvey, Ruth S..........Philadelphia
Johnson, Miss S.........Philadelphia
Johnson, E. E............Philadelphia
Jenkins, T. L.....East Mauch Chunk
Kurtz, Elizabeth....East Stroudsburg
Mansley, Walter E......Philadelphia
Michener, Elmer E......Philadelphia
Markle, Elinor A........Philadelphia
Morris, Miss Helen............Wayne
Peter, Miss Mary........Philadelphia
Roddy, H. Justin..........Millersville
Reilley, Katharine C.....Philadelphia
Ridington, Thomas T....Philadelphia
Roorbach, G. B...........Philadelphia
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THE ANDES OF SOUTHERN PERU. By Isaiah Bowman, Director of the American Geographical Society. Published for the Society by Henry Holt and Co., New York, 1916. pp. XI+336.

A volume which has the distinction of being reviewed by ex-President Roosevelt (*Geog. Review* for April) should receive more than the modest notice here accorded it. Yet, when our versatile ex-president devotes four full pages to Dr. Bowman's book, there isn't much more to say. The volume deserves the high tribute paid to it by Mr. Roosevelt, and we congratulate the author upon this splendid piece of geographical research and geographical writing. Printing, drawings, half tones, binding, everything—are of the very highest order. Seldom does one handle a book which in every particular seems so satisfying. The arrangement of topics is skillful; the reader finds the early chapters rich in items of human interest—leading easily and naturally into the more scientific chapters which form part II. A piece of work like "The Andes of Southern Peru" is no small achievement. It is a credit to geography and geographical scholarship in the United States.

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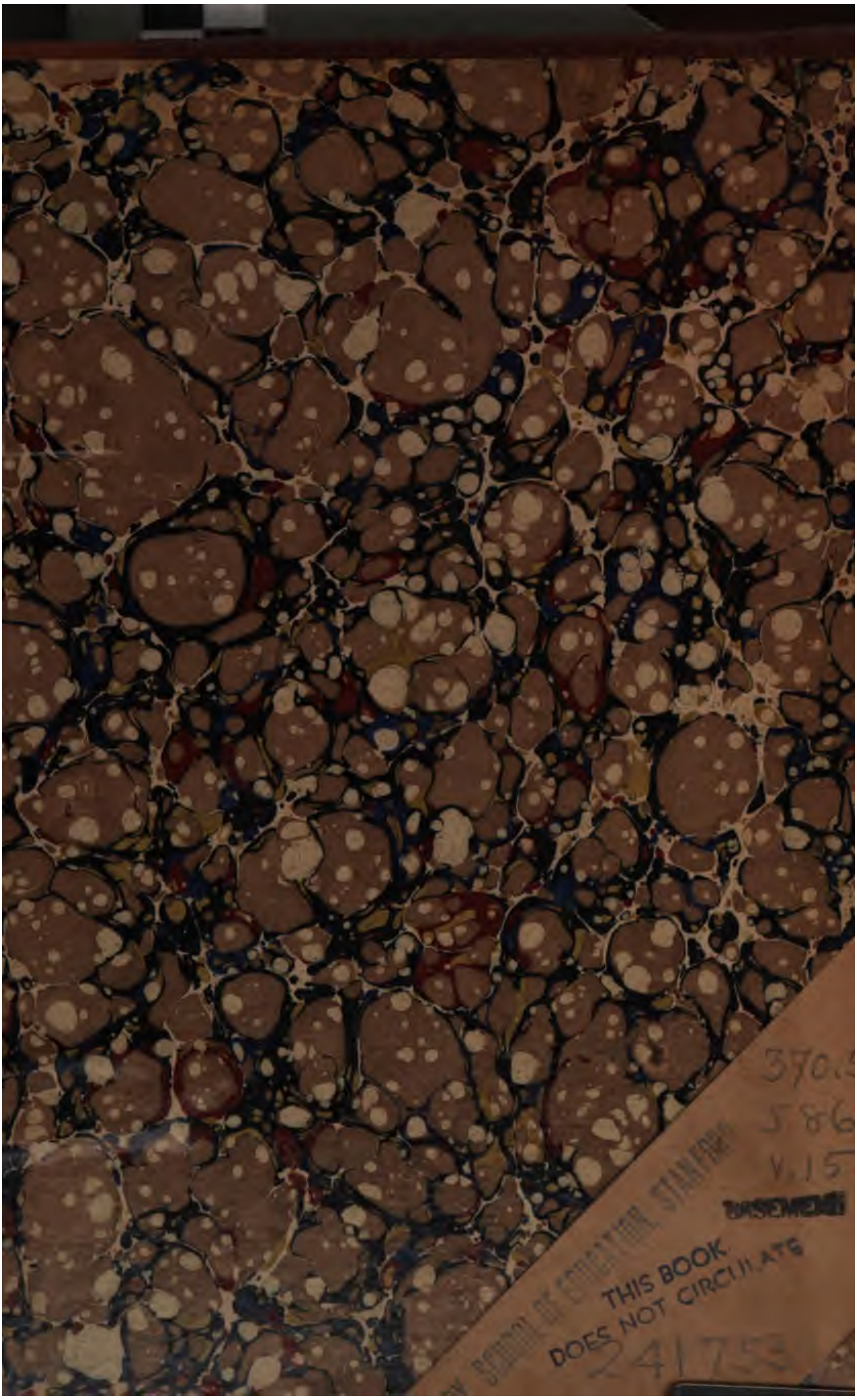

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